Ex Libris
C. K. OGDEN

THE LIBRARY
OF
THE UNIVERSITY
OF CALIFORNIA
LOS ANGELES

THE
HOME UNIVERSITY LIBRARY
OF MODERN KNOWLEDGE

A COMPREHENSIVE SERIES OF NEW
AND SPECIALLY WRITTEN BOOKS

EDITORS:

Prof. GILBERT MURRAY, D.Litt., LL.D., F.B.A.
The Rt. Hon. HERBERT FISHER, LL.D., F.B.A.
Prof. J. ARTHUR THOMSON, M.A., LL.D.
Prof. WILLIAM T. BREWSTER, M.A.

256 pages. ▫ ▫ ▫ ▫ **In cloth binding.**

HISTORY AND GEOGRAPHY

3. THE FRENCH REVOLUTION. By HILAIRE BELLOC, M.A. (With Maps.)
4. A SHORT HISTORY OF WAR AND PEACE. By G. H. PERRIS.
8. POLAR EXPLORATION. By Dr W. S. BRUCE, F.R.S.E., Leader of the *Scotia* Expedition. (With Maps.)
12. THE OPENING-UP OF AFRICA. By Sir H. H. JOHNSTON, G.C.M.G., F.Z.S. (With Maps.)
13. MEDIÆVAL EUROPE. By H. W. C. DAVIS, M.A. (With Maps.)
14. THE PAPACY AND MODERN TIMES (1303-1870). By WILLIAM BARRY, D.D.
23. HISTORY OF OUR TIME (1885-1913). By G. P. GOOCH, M.A.
25. THE CIVILISATION OF CHINA. By H. A. GILES, LL.D., Professor of Chinese at Cambridge.
29. THE DAWN OF HISTORY. By J. L. MYRES, M.A., F.S.A.
33. THE HISTORY OF ENGLAND. By Prof. A. F. POLLARD, M.A. (With a Chronological Table.)
34. CANADA. By A. G. BRADLEY.
37. PEOPLES AND PROBLEMS OF INDIA. By Sir T. W. HOLDERNESS, K.C.S.I.
42. ROME. By W. WARDE FOWLER, M.A.
48. THE AMERICAN CIVIL WAR. By F. L. PAXSON.
51. WARFARE IN BRITAIN. By HILAIRE BELLOC, M.A.
55. MASTER MARINERS. By J. R. SPEARS.

61. NAPOLEON. By the Rt. Hon. Herbert Fisher, LL.D., F.B.A.
66. THE NAVY AND SEA POWER. By David Hannay.
71. GERMANY OF TO-DAY. By Charles Tower.
82. PREHISTORIC BRITAIN. By Robert Munro, M.A., M.D., LL.D., F.R.S.E. (Illustrated.)
91. THE ALPS. By Arnold Lunn. (Illustrated.)
92. CENTRAL AND SOUTH AMERICA. By Prof. W. R. Shepherd. (Maps.)
97. THE ANCIENT EAST. By D. G. Hogarth, M.A. (Maps.)
98. WARS BETWEEN ENGLAND AND AMERICA. By Prof. T. C. Smith, M.A.
100. HISTORY OF SCOTLAND. By Prof. R. S. Rait.
101. BELGIUM. By R. C. K. Ensor. (Maps.)
105. POLAND. By Prof. W. Alison Phillips. (With Maps.)
107. SERBIA. By L. F. Waring.
108. OUR FORERUNNERS. A Study of Palæolithic Man's Civilisations in Western Europe and the Mediterranean Basin. By M. C. Burkitt, M.A., F.S.A. (Illustrated.)
113. WALES. By W. Watkin Davies, M.A., F.R.Hist.S.

LITERATURE AND ART

2. SHAKESPEARE. By John Masefield.
27. ENGLISH LITERATURE: MODERN. By G. H. Mair, M.A.
35. LANDMARKS IN FRENCH LITERATURE. By G. L. Strachey.
39. ARCHITECTURE. By Prof. W. R. Lethaby. (Illustrated.)
43. ENGLISH LITERATURE: MEDIÆVAL. By Prof. W. P. Ker, M.A.
45. THE ENGLISH LANGUAGE. By L. Pearsall Smith, M.A.
52. GREAT WRITERS OF AMERICA. By Prof. J. Erskine and Prof. W. P. Trent.
63. PAINTERS AND PAINTING. By Sir Frederick Wedmore. (With 16 half-tone Illustrations.) From the Primitives to the Impressionists.
64. DR JOHNSON AND HIS CIRCLE. By John Bailey, M.A.
65. THE LITERATURE OF GERMANY. By Prof. J. G. Robertson, M.A., Ph.D.
70. THE VICTORIAN AGE IN LITERATURE. By G. K. Chesterton.
73. THE WRITING OF ENGLISH. By W. T. Brewster, A.M., Professor of English in Columbia University.
75. ANCIENT ART AND RITUAL. By Jane E. Harrison, LL.D., D.Litt.
76. EURIPIDES AND HIS AGE. By Gilbert Murray, D.Litt., LL.D., F.B.A.
87. CHAUCER AND HIS TIMES. By Grace E. Hadow.
89. WILLIAM MORRIS: HIS WORK AND INFLUENCE. By A. Clutton Brock.
93. THE RENAISSANCE. By Edith Sichel.
95. ELIZABETHAN LITERATURE. By J. M. Robertson, M.P.
99. AN OUTLINE OF RUSSIAN LITERATURE. By Hon. Maurice Baring.
103. MILTON. By John Bailey, M.A.
111. PATRIOTISM IN LITERATURE. By John Drinkwater, M.A.
112. MUSIC. By Sir W. H. Hadow.

SCIENCE

7. MODERN GEOGRAPHY. By Marion I. Newbigin, D.Sc.
9. THE EVOLUTION OF PLANTS. By Dr D. H. Scott, M.A., F.R.S (Illustrated.)
17. HEALTH AND DISEASE. By W. Leslie Mackenzie, M.D.
18. INTRODUCTION TO MATHEMATICS. By A. N. Whitehead, Sc.D., F.R.S. (With Diagrams.)
19. THE ANIMAL WORLD. By Prof. F. W. Gamble, F.R.S. With Introduction by Sir Oliver Lodge. (Many Illustrations.)
20. EVOLUTION. By Prof. J. Arthur Thomson, M.A., and Prof. Patrick Geddes.
22. CRIME AND INSANITY. By Dr C. A. Mercier.
28. PSYCHICAL RESEARCH. By Sir W. F. Barrett, F.R.S.
31. ASTRONOMY. By A. R. Hinks, M.A., Chief Assistant, Cambridge Observatory.
32. INTRODUCTION TO SCIENCE. By J. Arthur Thomson, M.A.
36. CLIMATE AND WEATHER. By Prof. H. N. Dickson, D.Sc.Oxon., M.A., F.R.S.E. (With Diagrams.)
41. ANTHROPOLOGY. By R. R. Marett, M.A.
44. THE PRINCIPLES OF PHYSIOLOGY. By Prof. J. G. McKendrick, M.D.
46. MATTER AND ENERGY. By F. Soddy, M.A., F.R.S.
49. PSYCHOLOGY, THE STUDY OF BEHAVIOUR. By Prof. W. McDougall, F.R.S., M.B.
53. THE MAKING OF THE EARTH. By Prof. J. W. Gregory, F.R.S. (With 38 Maps and Figures.)
57. THE HUMAN BODY. By Prof. Sir A. Keith, M.D., LL.D. (Illustrated.)
58. ELECTRICITY. By Gisbert Kapp, D.Eng. (Illustrated.)
62. THE ORIGIN AND NATURE OF LIFE. By Dr Benjamin Moore, Professor of Bio-Chemistry, University College, Liverpool.
67. CHEMISTRY. By Raphael Meldola, F.R.S. Presents clearly the way in which chemical science has developed, and the stage it has reached.
72. PLANT LIFE. By Prof. J. B. Farmer, D.Sc., F.R.S. (Illustrated.)
78. THE OCEAN. A General Account of the Science of the Sea. By Sir John Murray, K.C.B., F.R.S. (Colour Plates and other Illustrations.)
79. NERVES. By Prof. D. Fraser Harris, M.D., D.Sc. (Illustrated.) A description, in non-technical language, of the nervous system, its intricate mechanism, and the strange phenomena of energy and fatigue, with some practical reflections.
86. SEX. By Prof. Patrick Geddes and Prof. J. Arthur Thomson, LL.D.
88. THE GROWTH OF EUROPE. By Prof. Grenville Cole. (Illustrated.)
109. COMMERCIAL GEOGRAPHY. By Marion I. Newbigin, D.Sc.
110. AN INTRODUCTION TO THE STUDY OF HEREDITY. By Prof. E. W. MacBride, M.A., D.Sc., LL.D., F.R.S. (Illustrated.)

PHILOSOPHY AND RELIGION

15. MOHAMMEDANISM. By Prof. D. S. Margoliouth, M.A., D.Litt.
40. THE PROBLEMS OF PHILOSOPHY. By the Hon. Bertrand Russell, F.R.S.
47. BUDDHISM. By Mrs Rhys Davids, M.A.
50. NONCONFORMITY: ITS ORIGIN AND PROGRESS. By Principal W. B. Selbie, M.A.

54. ETHICS. By G. E. Moore, M.A.
56. THE MAKING OF THE NEW TESTAMENT. By Prof B. W. Bacon, LL.D., D.D.
60. MISSIONS: THEIR RISE AND DEVELOPMENT. By Mrs Creighton.
68. COMPARATIVE RELIGION. By Prof. J. Estlin Carpenter, D.Litt.
74. A HISTORY OF FREEDOM OF THOUGHT. By J. B. Bury, Litt.D., LL.D.
84. LITERATURE OF THE OLD TESTAMENT. By Prof. George Moore, D.D., LL.D.
90. THE CHURCH OF ENGLAND. By Canon E. W. Watson.
94. RELIGIOUS DEVELOPMENT BETWEEN THE OLD AND NEW TESTAMENTS. By Canon R. H. Charles, D.D., D.Litt.
102. HISTORY OF PHILOSOPHY. By Clement C. J. Webb.

SOCIAL SCIENCE

1. PARLIAMENT. Its History, Constitution, and Practice. By Sir Courtenay P. Ilbert, G.C.B., K.C.S.I.
5. THE STOCK EXCHANGE. By F. W. Hirst, Editor of *The Economist.*
6. IRISH NATIONALITY. By Mrs J. R. Green.
10. THE SOCIALIST MOVEMENT. By J. Ramsay MacDonald, M.P.
11. CONSERVATISM. By Lord Hugh Cecil, M.A., M.P.
16. THE SCIENCE OF WEALTH. By J. A. Hobson, M.A.
21. LIBERALISM. By L. T. Hobhouse, M.A.
24. THE EVOLUTION OF INDUSTRY. By D. H. Macgregor, M.A.
26. AGRICULTURE. By Prof. W Somerville, F.L.S
30. ELEMENTS OF ENGLISH LAW. By W. M. Geldart, M.A., B.C.L.
38. THE SCHOOL: AN INTRODUCTION TO THE STUDY OF EDUCATION. By J. J. Findlay, M.A., Ph.D.
59. ELEMENTS OF POLITICAL ECONOMY. By Sir S. J. Chapman, K.C.B.
69. THE NEWSPAPER. By G. Binney Dibblee, M.A (Illustrated.) The best account extant of the organisation of the newspaper press, at home and abroad.
77. SHELLEY, GODWIN, AND THEIR CIRCLE. By H. N. Brailsford, M.A.
80. CO-PARTNERSHIP AND PROFIT-SHARING. By Aneurin Williams, M.A.
81. PROBLEMS OF VILLAGE LIFE. By E. N. Bennett, M.A.
83. COMMON-SENSE IN LAW. By Prof. P. Vinogradoff, D.C.L.
85. UNEMPLOYMENT. By Prof. A. C. Pigou, M.A.
96. POLITICAL THOUGHT IN ENGLAND: FROM BACON TO HALIFAX. By G. P. Gooch, M.A.
104. POLITICAL THOUGHT IN ENGLAND: FROM SPENCER TO THE PRESENT DAY. By Ernest Barker, M.A.
106. POLITICAL THOUGHT IN ENGLAND: THE UTILITARIANS FROM BENTHAM TO J. S. MILL. By W. L. Davidson, M.A., LL.D.

Many other future volumes in preparation.

LONDON: WILLIAMS AND NORGATE, LTD.
And of all Bookshops and Bookstalls.

HOME UNIVERSITY LIBRARY
OF MODERN KNOWLEDGE

PREHISTORIC BRITAIN

By ROBERT MUNRO, M.A., M.D., LL.D., F.R.S.E.

London
WILLIAMS & NORGATE

HENRY HOLT & Co., New York
Canada: RYERSON PRESS, Toronto
India: BURNS, OATES & WASHBOURNE, Ltd.

HOME UNIVERSITY LIBRARY

OF

MODERN KNOWLEDGE

Editors:

HERBERT FISHER, M.A., F.B.A., LL.D.

PROF. GILBERT MURRAY D.LITT., LL.D., F.B.A.

PROF. J. ARTHUR THOMSON, M.A., LL.D.

PROF. WILLIAM T. BREWSTER, M.A. (Columbia University, U.S.A.)

NEW YORK
HENRY HOLT AND COMPANY

PREHISTORIC BRITAIN

BY

ROBERT MUNRO

M.A., M.D., LL.D., F.R.S.E.

AUTHOR OF "THE LAKE DWELLINGS OF EUROPE," "ARCHÆOLOGY AND FALSE ANTIQUITIES," "PALÆOLITHIC MAN AND TERRAMARA SETTLEMENTS IN EUROPE," ETC.

LONDON

WILLIAMS AND NORGATE

First printed December 1913
Reprinted July 1917
,, May 1919
,, November 1923

GN
315
M42p

CONTENTS

CHAP.		PAGE
I	INTRODUCTION—THE LAND—FAUNA—FLORA—ICE AGE—MAN . . .	7
II	EVIDENTIAL MATERIALS—EARLY DISCOVERIES—LYELL'S "ANTIQUITY OF MAN"	23
III	EVIDENTIAL MATERIALS (*continued*)—FURTHER DISCOVERIES IN BRITAIN, BELGIUM, AND FRANCE . . .	44
IV	PALÆOLITHIC TYPES OF MAN—THEIR CULTURE AND CIVILIZATION . .	68
V	THE TRANSITION FROM PALÆOLITHIC TO NEOLITHIC CIVILIZATION—THE "HIATUS" PROBLEM AND SUBMERGENCE OF THE LAND	100
VI	ARTS AND INDUSTRIES OF THE NEOLITHIC AND BRONZE AGES . .	134
VII	EARLY IRON AGE—HALLSTATT, LA TÈNE, AND LATE CELTIC PERIODS .	155

999697

CHAP. PAGE

VIII RELIGIOSITY AND COMMEMORATIVE MONUMENTS—CROMLECHS, DOLMENS, BARROWS, MENHIRS, ALIGNMENTS, ETC. 178

IX INHABITED SITES AND PROTECTIVE WORKS — CAVES, BEEHIVE HOUSES, HUT-CIRCLES, DENEHOLES, CAMPS, FORTS, LAKE-DWELLINGS, ETC. . 205

X BRITISH ETHNOLOGY—RIVER-BED RACE — NEOLITHIC AND BRONZE AGE PEOPLE—BRYTHONS—CONCLUSION . 228

BIBLIOGRAPHY 253

INDEX 254

PREHISTORIC BRITAIN

CHAPTER I

INTRODUCTION—THE LAND—FAUNA—FLORA—ICE AGE—MAN

As the word "prehistoric" has no limitation in the past history of the country, it logically follows that a treatise on "Prehistoric Britain" would have an equally wide range; but by a judicious discretion we limit the scope of this book to the period during which man was an inhabitant of Western Europe, prior to the invention of written records. But the Britain of that early period differed widely from the Britain of to-day both in climate and geographical area, and to some extent in its flora and fauna. Consequently our first duty is to describe with as much precision as modern researches will admit of, but very briefly, the physical conditions which obtained in prehistoric Britain when it comes within the above-defined scope of the present work. From this standpoint we have practically to discuss the entire field of the development of human civilization, as disclosed by the remains of Palæolithic and Neolithic races, both of which

have left traces of their existence within the British area.

On the other hand, the pre-history of our island, outside the limitation imposed on it by the appearance of man on the scene, goes back to the dawn of life on the globe; and it is largely to the modifications effected under the influence of cosmic agencies during this infinitely longer period that the country became a suitable *habitat* for *Homo sapiens*. A few preliminary words on this aspect of the subject will not, therefore, be considered out of place, as thereby the true starting-point of our main thesis will be brought into clearer relief. As we cannot endorse the opinion long held as a dogma in theological cosmogonies, that the multitudinous phenomena of the material world—the distribution of land and water, the evolution of plants and animals, the recurrence of seasons, etc.—were specially designed to minister to the welfare of mankind, we are bound to account for them on some other hypothesis. On this point all we affirm is that they were the outcome of the fixed laws which then governed, and still govern, the universe. Evidence in support of this conclusion is not far to seek. In the Geological and Palæontological records we have ample details of the successive changes the earth has undergone since it cooled down sufficiently to admit of organic life on its surface.

Land.—As to the actual formation of land, the larger portion of present-day Britain is

composed of vast beds of intermingled sands, gravels, mud, and organic débris, brought together by the action of rivers, sea-currents, etc., and rearranged into stratified layers—thus proving that they are mostly of aqueous origin. The reappearance of some of these sedimentary deposits as dry land, often rising to the height of mountains, shows that, *pari passu* with the action of the disintegrating and denuding agencies, oscillations in the relative level of sea and land were taking place in several localities. The causes of this variableness in land-areas so affected the portion of Europe now known as Great Britain that, from time to time, it assumed very different aspects, now forming part of a European continent, and again reduced to a mere speck in the Atlantic Ocean. These disturbing elements extended over a geological range of some 50,000,000 years, and during all that time the British area was a variable quantity. And even at the present time this instability has not altogether ceased, as we see extensive alterations going on around our shores, here increasing and there reducing our sea-board lands.

The statement that Britain was part of a European continent, when Palæolithic man first appeared as a naked savage among its woods and river-valleys, is not a haphazard assertion, but one founded on indisputable evidences. The numerous animals, many of them now extinct, which then found their way into Britain, such as the mammoth, rhinoceros,

hippopotamus, Irish elk, cave-bear, hyæna, etc., could not have done so had the English Channel been then in existence. Moreover, the bones of several of these animals have been repeatedly dredged up in fishermen's nets from the bed of the North Sea, under conditions which show that they found the means of living in the submerged localities in which their osseous remains are now found. Not less convincing is the fact that flint implements of Palæolithic types have been dug up from the valley gravels of the Thames and the Somme, considerably lower than the present surfaces of these estuaries. The discovery of the bones of the woolly-haired rhinoceros, reindeer, horse, etc., in a recently explored cave in Jersey can only be explained on the supposition that the island had been formerly part of the French mainland. The same argument applies to the finding of skeletons of the great Irish elk in the Isle of Man. Also, the submerged forests and raised beaches, described in geological text-books as occurring in several places around our seashores, testify to the prevalence of land oscillations within comparatively recent times.

Animals.—Concurrent with these fluctuations in the formation and distribution of continental land-areas the organic world was pursuing its marvellous course on the lines of evolution, producing, with unstinted copiousness and ever-changing adaptations, multitudes of living organisms, strange and sometimes fantastic-looking objects, whose sole

life-purpose seemed to be to propagate their kind, after which their functional activities began to wane and finally ended in somatic dissolution. The origin of life, notwithstanding much discussion, *e. g.* at the Dundee meeting of the British Association (1912), is still a mystery, but, according to evidence culled from the geological records and modern biological researches, its first recognizable garb was that of very simple single-celled organisms—simpler even than most of the Protozoa of to-day. Such single cells are universally regarded as the ultimate units in all the complex structural combinations of the organic world. By a critical study of these ever-changing morphological productions, we are enabled to trace the connecting links which bind living things into one united whole, with man as their crowning achievement. As we move along the stream of time the number, variety, and complexity of living forms become bewildering. The quest for food, protection from enemies, and sexual impulses seem to furnish the chief motives of their respective life-activities; and hence the *raison d'être* for the invention and differentiation of special organs to carry out these purposes. The policy adopted in propagating the species seems to be to flood the environment with their young progeny, with the result that there is a perpetual struggle for existence which always ends in the premature death of the vast majority. For, of the multitudes born, there is room for only a small fraction

to come to mature life. This waste of creative energy can only be defended on the plea that the survival of the fittest improves the future status of the successful competitors.

Biologists conversant with fossil records inform us that the life-histories of the great animal groups which now inhabit the earth have a wide range both in space and time. Invertebrates, of course, go back to pre-Cambrian times, but the Vertebrates are of more recent date. First, in ascending order, come Fishes (Silurian); then amphibians (Carboniferous); then Reptiles (Permian); then Birds and Mammals (Jurassic and Triassic respectively); but not till towards the close of the Tertiaries have we clear evidence of the presence of Man on the globe. All these geological formations, with their characteristic fossils, are to be found within the confines of the Britain of to-day.

Plants.—The evolution theory applies equally to the Vegetable Kingdom. In some respects the consecutive stages in the geological history of plants may be paralleled with those of animals. But the details of palæobotany are more difficult to decipher (see *Evolution of Plants* by D. H. Scott in this Library), and wide generalizations have hitherto been scanty. For our present purpose it is, however, enough to know that the members of the sub-Kingdom of the Angiosperms, or Flowering Plants, are not only the most recent in point of evolution, but the most numerous in the vegetable world of to-day. They em-

brace an endless variety of species widely different, in form, size and structural complexity. They exist under all the conditions of life, from the dense jungle of the Tropics to the home of eternal snows. In the ordinary walks of life we meet them everywhere, dominating our woodlands, prairies, meadows and ponds. The pedigree of a goodly number, including many dicotyledons (oaks, birches, hollies, etc.), as well as a few monocotyledons (palms, etc.), has been traced as far back as the Upper Cretaceous system. Their rapid evolution in recent geological times was characterized by Darwin as an "abominable mystery." But it is now suggested that their close relationship with insect life is a probable explanation of this mystery. In support of this idea it has been observed that the principal insects concerned in the fertilization of flowers came into being much about the same time, *i.e.* towards the end of the Cretaceous period. But, however this may be, the world-wide transformation, caused by the sudden rise and rapid evolution of the Flowering Plants, had a corresponding depressive influence on the Gymnosperms, Lycopods, Ferns, and Equisetums, which previously dominated the Plant world. Although many of these Cryptogams have still representatives within British lands, they occupy a subordinate position in comparison with the Angiosperms. Among Gymnosperms, the Coniferæ are the most interesting and conspicuous survivals to our day, still numbering some 300 species. They

include the pines, firs, yews, cypresses, araucarias, etc. Among them are to be found some of the largest forest trees, for instance the Mammoth Tree of California (*Wellingtonia gigantea*), and the handsome Japanese Cedar (*Cryptomeria japonica*). On the other hand, the horsetails have dwindled down to a few insignificant species, although their forebears were great forest trees with wide-spreading branches. Also, their supposed precursors, the calamites, which grew in large groups on the margins of lagoons in the Carboniferous Age, and possessed huge jointed-stems, supported by massive rhizomes and far-spreading roots, appear to have died out altogether in the Permian period. Our modern ferns are also diminutive in comparison with those of former ages; while all the modern Lycopodiaceæ are puny representatives of the great tree-forms which flourished during the Carboniferous period, and which are now so largely met with as fossils in our British coal-fields.

Ice Age.—Among the physical phenomena which materially helped to mould Britain into its present shape was the incoming of the great Ice Age. This singular episode in the world's history lasted during the whole of the Pleistocene period, but not as one continuous span of advance and retreat of its accompanying load of ice, but rather as a series of ice ages alternating with warm intervals of long duration. At the time of maximum glaciation the larger portion of Britain was

covered with a vast *mer de glâce*, causing the environment to be in a state of general instability. The effect of moving masses of ice over the low-lying lands was to smooth their surface, here polishing and striating protruding rocks, there equalizing irregularities by filling up the hollows with the disintegrated materials. The gradual change from a tropical climate to one of Arctic severity, with interglacial warm intervals, led to the incoming into Central and Western Europe of different faunas, at one time hailing from sub-tropical and at another from sub-arctic regions. Here, for a time, these immigrants found a congenial home, but ultimately most of them succumbed to the extreme change of climate which subsequently ensued, and the consequent severe struggle for existence to which they were subjected.

To correlate the successive land-areas of the Pleistocene period with the contemporary works of man is a somewhat speculative undertaking in the present state of our knowledge; the most feasible hypothesis is that which makes man's earliest appearance in Britain contemporary with the inter-glacial warm period which immediately followed that of maximum glaciation. As soon as the increasing ice passed its meridian and the environment responded to a warmer temperature, torrential rivers, caused by the melting of the ice, began the work of excavating the river valleys and clearing away the accumulated deposits caused by the previous state of submergence. Con-

current with these changes a process of elevation of the land set in and continued until a large portion of Western Europe stood so high as to convert the present beds of the Irish Sea, the English Channel and the North Sea into dry land. The Thames and all the rivers of the east coast united with the Rhine and the Elbe to form what must have been a noble river flowing northwards and ultimately debouching into the sea, not far from the Faröe Islands. The Seine and the Somme formed a junction in the English Channel and, after gathering the surplus waters of the south of England and the north of France, continued their course as a fair-sized river to the Atlantic, some 100 miles farther west. The Severn received some streams from the basin of the Irish Sea, the lowest portion of which was then occupied by a chain of fresh-water lakes, and then followed a similar course to the Atlantic. Thus Great Britain, Ireland, the Isle of Man, Jersey and other islands formed part of the inland uplands of a European continent.

While these far-reaching changes were in progress under a climate becoming more and more ameliorated, these richly wooded and well-watered plains (now mostly submerged) became attractive feeding-ground for large herds of grazing animals, followed of course by bears, lions and hyænas, whose natural prey they were. It was, in all probability, during the stage of maximum geniality that so many sub-tropical animals, such as the

two earlier elephants, the hippopotamus, the *Rhinoceros merckii*, sabre-toothed tiger (*Machairodus*), cave-bear, cave-lion, etc., found their way into Britain. But these animals were ultimately caught as in a trap by a subsequent recrudescence of a cold period, the consequence of which was that most of them became extinct, and left their carcases on the battle-field, as evidence of their former existence in these regions. It is also during this inter-glacial period that we first meet with evidence that Palæolithic man was an inhabitant of Britain.

These remarks will suffice to show that during the Pleistocene Age the geography of Western Europe was very different from what it is now. Since the appearance of man on the scene, at least one Ice Age has occurred, but the ice-fields which accompanied it did not spread so far out on the lower grounds, probably in consequence of a drier state of the atmosphere. It should also be noted that contemporary with the recrudescence of the ice there was again a subsidence of the land. Whether ice pressure and land submergence have any causal connection it is difficult to say, but the affirmative is the more feasible answer.

Man.—As an immigrant into Britain Palæolithic man had been subjected, like other animals, to the trials and discomforts which followed the changing vicissitudes of climate, but he, almost alone, survived the hardships of these cosmic persecutions. How he suc-

ceeded in warding off the fate of the extinct mammals falls to be described in subsequent pages. Meantime we have to consider what were his physical and mental characteristics when he first comes within the scope of our researches. Some knowledge of his forebears and previous habits are indispensable in order to define, with some degree of accuracy, the starting-point of the story of his future career on the British area, which is the main object of this little volume.

Although Palæolithic man was not the same as man of to-day, yet he was already in possession of the distinguishing characteristics of humanity. The preliminary problem which now falls to be considered is how he acquired these remarkable and unique features.

The races of mankind now living are differentiated from all other animals by the erect attitude, bipedal locomotion, manipulative hands, and a larger and more highly developed brain. All these characters apply to Palæolithic man, with perhaps the exception of the reasoning faculty, which, however, differed from that of civilized man only in degree. For a long time no rational explanation of how these human characteristics were acquired was forthcoming, and even now their origin and development are only beginning to be understood.

At an early stage in the evolution of animal life the power of moving from one locality to another became essential to the individual organism, the object being to secure a better

supply of food than was possible in a fixed position, such as that of a plant. Among lower organisms movement was accomplished in various ways—vibratile filaments, ciliary organs, pseudopodia, etc.; but in all the higher vertebrates locomotion was effected by means of four movable limbs, capable of supporting and transporting the animal at will. As these four-footed animals became greatly affected by the struggle for life, owing to the rapid multiplication of species and the ever-varying conditions of the environment, it followed that the limbs became also more or less modified, so as to make them suitable, not only for increased speed in altered circumstances, but useful to the animal economy in other ways. Hence they became adapted for diverse purposes, such as swimming, flying, climbing, grasping, scraping, etc. The anterior limbs, owing to their proximity to the head, were more frequently selected for such transformations, as may be seen in the wings of birds and bats. But whatever modifications the fore-limbs may have undergone, no animal, but man, has ever succeeded in divesting them of their primary function of locomotion. This achievement was primarily due to the attainment of the erect attitude, which necessitated a rearrangement of the functions of the limbs—the anterior being henceforth entirely restricted to manipulative and prehensile purposes, and the posterior to locomotion.

The maintenance of the erect attitude

involved some anatomical alterations in the structure of the body. Not only were the bones of the limbs adapted to perform their respective functions under the new conditions, but the spine had to be turned by a quarter of a circle, so as to be in the vertical direction, *i.e.* in line with the posterior limbs. The skull, which was formerly supported by a powerful muscle (*Ligamentum nuchæ*), moved backwards until it became equipoised on the top of the vertebral column. The upper limbs, now relieved from having any share in the locomotion of the body, assumed great freedom in the various movements of flexion, pronation, and supination. The fingers became longer and could be opposed, singly or in groups, to the thumb so as to form a hook, a clasp or a pair of pincers; and the palm of the hand could be made into a cup-shaped hollow capable of grasping a sphere. In fact, the hand of man is the most perfect piece of mechanism Nature has yet produced. But these morphological changes involved no obliteration of the primary homologies common to the rest of the higher vertebrates. All the bones, muscles, nerves, blood-vessels and sensory organs remained much the same as those of the anthropoid apes, which are the nearest of kin to man. But if the races of mankind are so closely related both in structure and mode of development to the anthropoid apes, what, it may be asked, are the essential characters which differentiate them from the latter? The authors of *Mammals*

Living and Extinct (p. 740) thus answer the question :

"The distinctions between the *Hominidæ* and *Simiidæ* are chiefly relative, being greater size of brain and of brain-case as compared with the facial portion of the skull, smaller development of the canine teeth of the males, complete adaptation of the structure of the vertebral column to the vertical position, greater length of the lower as compared with the upper extremities, and greater length of the *hallux* or great toe, with almost complete absence of the power of bringing it in opposition to the other four toes. The last feature, together with the small size of the canine teeth, are perhaps the most marked and easily defined distinctions that can be drawn between the two groups."

This close analogy in bodily structure between man and the lower animals is strongly suggested by the facts of embryology, as all the homologous organs in the full-grown animal, such as the flipper of a whale, the wing of a bird and the hand of man, are developed from the same fundamental parts in the embryo. On similar grounds it can be proved that the human hand and foot had been developed from limbs which were somewhat similar to those of the quadrumana, which are specially adapted for arboreal life. It is of some significance to note that the great grasping power of the fore-limbs is still

retained at birth, as shown by the remarkably tight and persistent grasp of a newly-born baby—a fact which is well known to accoucheurs.

The theory of the descent of man from the lower animals is also strongly supported by the presence in the human body of a number of vestigial organs, which are now useless in the human economy, but whose homologues in other animals have well-defined functions. Among such organs are the coccyx, intra- and supra-condyloid foramina of the humerus, and the *appendix vermiformis*. But indeed the detailed structure of the entire human body is utterly inexplicable on any other hypothesis. See Dr. Arthur Keith's volume on *The Human Body* in this Library.

But of all the problems relating to the origin and descent of Man the most important is to account for the great superiority of his reasoning powers. The hypothesis, that this profound distinction is primarily due to his being in possession of true hands, is the most feasible explanation that has hitherto been advanced on the subject. By means of hands man manufactured tools and weapons, and utilized them to such an extent that they ultimately superseded his natural means of defence. The knowledge, skill and experience thus acquired gradually led to an increase in brain substance—the undoubted organ of thought. This handicraft skill was absolutely a new departure in the history of organic evolution, as no other animal is, or ever was,

a tool-maker, and the successful application of this discovery to practical life is alone sufficient to place man in a category by himself.

Thus with bipedal locomotion, limbs specialized into hands and feet, *Homo sapiens* started on his human career as a tool-maker. Only in brain capacity and a corresponding deficiency in the exercise of the reasoning faculty was he below civilized man of to-day. His subsequent career, as an inhabitant of Britain, falls to be described in this book; and then we shall have an opportunity of correlating the products of his mechanical skill with development of his brain. Along with this book there should be read the volumes on *Anthropology* (Marett) and *The Dawn of History* (Myres) in this Library.

CHAPTER II

EVIDENTIAL MATERIALS—EARLY DISCOVERIES —LYELL'S "ANTIQUITY OF MAN"

From the remarks made in the previous chapter it will be seen that the evolution of man has passed through two chronological stages. The first coincided with the time during which the morphological changes involved in the permanent assumption of the erect attitude were being effected. The second ranges contemporaneously with the

development of the higher mental faculties, consequent on the stimulation induced by the manipulative functions of the hand, as exemplified in the manufacture of tools and their application to the exigencies of human life. The changes produced in the human body during the first stage, being readily accomplished under the ordinary laws of organic morphology, were completed in a comparatively short time. Those of the latter, being almost co-extensive with the life-history of men on the globe, have occupied a much longer time. To convert the small increments of knowledge, gathered from experience of the laws of nature, and the working of a variety of novel mechanical contrivances, into brain substance, is a process of slow growth. Nor can any limitation be put on its duration, as it runs on parallel lines with human civilization, and is as applicable to the modern as to the early races of mankind. As evidence of the progressiveness of brain development, which went on from generation to generation during this long stage in the history of humanity, we have a series of fossil skulls showing, in chronological sequence, a gradual abandonment of simian characters, and a steady approachment to the cranial characters of the civilized races of to-day.

Among the structural changes effected in the course of this brain development was a retrocession or contraction of the facial bones, especially the jawbones, towards the central axis of the spinal column, and a backward

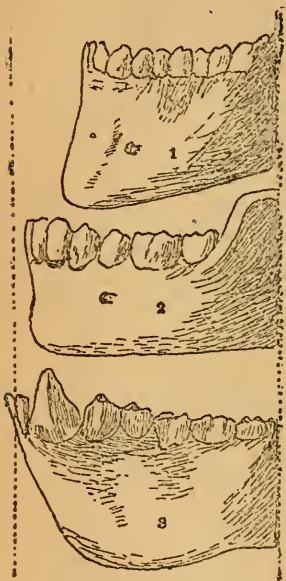
shifting of the cerebrum over the cerebellum. As the gradual filling up of the cranial cavity progressed necessarily *pari passu* with these modifications, we have, in the facial angle of Camper, a rough mechanical means of estimating the advance of mental development during the period of man's existence as a human being, *i.e.* since he attained the erect attitude.

Among the minor results of this retrocession of the facial bones was a gradual contraction of the alveolar borders of the jaws, thus crowding the teeth into a smaller space. The consequence was that the third molar teeth, which were the largest, or at least the same size as their neighbours, in the jaws of the Palæolithic races, became gradually smaller, until in civilized races they have dwindled into almost vestigial organs.

Another distinction between the earlier fossil skeletons and those of modern civilized races is that the latter have well-formed chins, forming a striking contrast to the simian-like mandibles of the former, as shown in Fig. 1. This is the most remarkable feature of the recently discovered Piltdown mandible in Sussex (see Fig. 9). Whatever may be the precise cause of this peculiarity, there can be no doubt that the gradual formation of the human chin has a remarkable parallelism with the progress of man's intellectuality, ever since he diverged from the common stem line from which he and the anthropoid apes have descended.

There are thus two distinct lines on which

investigations into the past history of mankind may be profitably conducted, both of which start from the attainment of the erect attitude—one dealing with the fossil remains of past races, and the other with their handi-



1. Chin of a modern Frenchman.

2. That of a young man from *Grotte des Enfants* Mentone — *Race de Grimaldi.*

3. Lower jaw of a fossil monkey (*Dryopithecus*).

FIG. 1.—Profile of Lower Jaws. (*After Gaudry.*)

craft products. The evidential materials to be gathered from these different sources consist, in the one case of some fragments of a few skeletons of former races, which, by some fortuitous circumstances, have to this day resisted the disintegrating forces of nature;

and, in the other, of a number of specimens of man's handicraft works, which, being largely made of such endurable substance as flint, are more abundantly met with. The successive modifications which these respective materials have undergone during a long series of ages, though different in kind, are found to bear a decided ratio to the progress of human intelligence. Thus, taking the human skull at the starting-point of humanity as comparable to that of one of the higher apes, we know, as a matter of fact, that during the onward march of time it has undergone some striking changes, both in form and capacity, before reaching the normal type of modern civilized races—changes which can be largely classified in chronological sequence. Similarly, the artificial products of man's hands show a steady improvement in type, technique and efficiency, commensurate with his progressive knowledge of the laws of nature and his ability in applying them to mechanical and utilitarian purposes. Indeed, the trail of humanity along its entire course is strewn with the discarded weapons and tools which, from time to time, had to give way to others of greater efficiency. Such obsolete objects are now only collected as curiosities to be preserved in archæological museums.

From this vast field of anthropological and archæological materials we are expected to convey to our readers some general idea of their scientific value, in illustrating the progressive advances of the earliest British

inhabitants from savagedom to the goal of human civilization. It must also be borne in mind that in this and the following chapter, which deals with Palæolithic remains, no distinction can be drawn between relics found in Britain and the adjacent lands of Europe, as these land-areas were then united into one great continent. Many of the connecting links are probably strewn on the beds of the English Channel and the North Sea, or on former inhabited sites and submerged forests.

Early Discoveries.—Prior to the publication of Sir Charles Lyell's work on *The Geological Evidences of the Antiquity of Man*, isolated discoveries were recorded in different parts of Europe, disclosing anthropological facts which, in the opinion of a few savants, could only be accounted for by assigning to man a higher antiquity than was then the current opinion in scientific circles. These discoveries consisted of the fossil remains of man associated with flint implements and the bones of extinct animals in undisturbed deposits of the Quaternary period. But the reception given to this class of evidence was most discouraging, as may be judged from the following notes on a few of the earlier records.

About 1690 a flint implement of excellent workmanship of the *coup-de-poing* type (Fig. 2), was found along with the tooth of a mammoth in a gravel bed at Gray's Inn Lane, London, and presented to the British Museum. Though described in the Sloane Catalogue and exposed to public view ever since, it lay there,

as an object of no significance, until 1859, when Sir A. W. Franks recognized its close similarity to the flint implements discovered

Fig. 2.—Flint implement (*coup-de-poing*) found in Gray's Inn Lane ($\frac{1}{2}$).

by M. Boucher de Perthes in the gravels of the Somme valley. A similar fate befell a later discovery (1797) of flint implements, associated with the bones of extinct animals, at Hoxne in Suffolk.

About the beginning of the second quarter of last century the Rev. J. MacEnery found flint implements, associated with bones and teeth of extinct animals, below a thick continuous sheet of stalagmite in Kent's Cavern. But the legitimate inference from these facts, viz. that man was contemporary with these animals and lived before the stalagmite was deposited, had found no acceptance, even among the scientists of the day. Further discoveries, confirming the truth of MacEnery's statements, were made in Kent's Cavern (1840) and described at a meeting of the British Association; but they were also discredited. It was not till 1865 that a majority of the Council became sufficiently convinced of the importance of the archæological remains found in Kent's Cavern to appoint a committee, with a money grant, for its complete excavation on scientific principles.

In 1829 Dr. Schmerling commenced his memorable researches in the caverns of the province of Liége. The evidence of man's antiquity revealed by his discoveries consisted of flint implements and remains of human skeletons, associated with bones of the hyæna, cave-bear, cave-lion, rhinoceros, mammoth and reindeer. An illustrated account of his discoveries was published in 1833–4, in which the author, in the most unequivocal language, contended for the contemporaneity of man with the extinct animals; but owing chiefly to the influence of the celebrated naturalist, Cuvier, his opinions did not re-

ceive the attention they merited. Sir Charles Lyell paid a visit to Dr. Schmerling in 1833, and expressed some incredulity respecting the alleged antiquity of the fossil bones, but afterwards he changed his opinion and made an apology for his former scepticism. The apology itself is of little consequence, but the statements therein made form a most interesting account of the difficulties under which Dr. Schmerling carried on his researches, and supply evidence of the enthusiasm and persistence with which he advocated what he believed to be truth in face of an unbelieving world.

The discovery by M. Boucher de Perthes of rude flint implements, associated with bones of the mammoth and other extinct animals, in the ancient river gravels of the valley of the Somme, at various heights above the present highest flood-marks of the river, equally failed to attract public attention. An account of his discoveries, under the title *Antiquités celtiques et antédiluviennes* was published in 1847, but for upwards of ten years it remained a dead letter. At last, through the intervention of a few English savants, his novel antiquities were rescued from obscurity. The first English convert to M. de Perthes' opinions was Dr. Hugh Falconer, F.R.S., who, writing in November 1858, thus expressed himself on the subject:

"After devoting the greater part of a day to his vast collection, I am perfectly satisfied

that there is a great deal of fair presumptive evidence in favour of many of his speculations regarding the remote antiquity of these industrial objects and their association with animals now extinct." (*Essays*, etc., by Lady Prestwich, 1901, p. 83.)

"On the 23rd of March, 1863, some four years after a few of the leading archæologists

Fig. 3.—Outline of the Moulin-Quignon Jaw (½). (*After Quatrefages.*)

of France and England had come to recognize the truth of Dr. Falconer's opinion, a workman engaged in digging gravel near a windmill called Moulin-Quignon, in the suburbs of Abbeville, came to inform M. Boucher de Perthes that a small portion of a bone was to be seen projecting from the face of a cutting then in progress. He and a friend (M. Dimpre) went on at once to the spot and witnessed the extraction of the bone, which proved to be a human mandible (Fig. 3). It was embedded in a dark sandy ferruginous seam, almost in

contact with the underlying chalk; four and a half metres from the surface, and thirty metres above the level of the Somme. Associated with this bone were some flint implements of the usual types, which were then unsuspiciously accepted as genuine relics. The news of this discovery caused great excitement among leading anthropologists on both sides of the Channel, and many of them at once visited the locality.

"Meanwhile doubts as to the authenticity of the jaw had been freely expressed by some of the English visitors, and hence a controversy arose, which soon reached such a climax that the disputants arranged to hold an international Congress of representative men to inquire into the whole circumstances. Accordingly, this Congress was opened in Paris on the 9th of May, 1863. France was represented by MM. Lartet, Delisse, De Quatrefages, Bourgeois, Bateux, Gaudry, Desnoyers, and Milne-Edwards; and England by MM. Falconer, Prestwich, Carpenter and Busk—Evans had also been nominated, but was unable to attend. M. Milne-Edwards presided, and in the name of his French colleagues presented a report affirming the authenticity of the jaw; but after many meetings, much discussion, and a visit to Abbeville, the English representatives remained unconvinced, and so the Congress dispersed, leaving the jaw as much as ever a bone of contention." (From *Archæology and False Antiquities*, p. 32.)

Subsequently it became mooted that the jaw, along with other human bones, had been found in a prehistoric grave in the neighbourhood, and secretly deposited in the gravel-pit by a workman. There was, however, this difference between the jaw and the other bones, that the former was covered with the dark mud of the gravel-pit, while the latter had the appearance of having been long in contact with a reddish sandy matrix. But in sawing through a portion of the jaw its interior was found to contain a reddish material totally different from that on its external surface.

Another incident which raised some suspicion about the authenticity of the jaw was, that M. Boucher de Perthes had offered a reward of 200 francs to the first workman who would discover a human bone *in situ*. Eight days later, according to G. de Mortillet, he was informed of the discovery of the jaw at Moulin-Quignon.

That the Moulin-Quignon mandible was a fraud is the verdict which finds general acceptance among anthropologists of the present day. But at the time M. de Perthes unfortunately looked on the matter as a question of personal veracity. It was taken out in his presence, and, therefore, must be authentic. Lady Prestwich (*loc. cit.*, p. 91) tells us that it was a bitter disappointment to him that his English friends, "in acknowledging the fact of the human jaw having been truly found as described, yet refused

to admit that it belonged to a remote antiquity."

Among the earlier discovered fossil remains of man, supposed to have a high antiquity, may be noticed "the fossil man of Denise." The find consisted of fragments of several human bones embedded in porous lava from the extinct volcano of Denise, near Le Puy (Haute-Loire). The chief interest attached to the discovery, if genuine, was that it made man contemporary with the mammoth, and coeval with the last eruptions of the Le Puy volcanoes. Several pieces of this lava containing more or fewer human bones were found, but the first described was in 1844 by M. Aymard, Conservator of Le Puy Museum. This specimen was found by a workman, and contained within its substance the frontal and other parts of the skull, as well as some lumbar vertebræ, a radius and some metatarsal bones. According to M. E. Sauvage (*Rev. d'Anthropologie*, 1872), who carefully studied the matter, the skull-bones presented the osteological characters of the Neanderthal-Spy race, viz. prominent superciliary ridges and glabella, surmounted by a low, retreating forehead. The authenticity of this fossil was generally admitted by all the competent authorities who examined it, among them being Sir Charles Lyell. But this conclusion was out of harmony with the theological beliefs of the time, and so, for a time, it became discredited, and like other discoveries of the kind failed to lead to further results.

One of the most famous discoveries of the pre-Lyellian period was the human skeleton found in the cave of Feldhofen, situated at the entrance to a small ravine called Neanderthal, on the right bank of the river Düssel. The opening to the cave was from a small terrace on a steep limestone cliff, about 60 feet above the bed of the river, and 110 feet below the surface of the plateau above. The cave has long ago been quarried away, but its dimensions are reported to have been 16 feet in length, 11 feet in breadth, and 8 feet in height. On the uneven floor of the cave lay a mass of consolidated mud, about five feet in depth, sparingly mixed with rounded fragments of chert, but without stalagmitic deposits. It was while this mud was being removed that the skeleton was encountered. At first no idea was entertained by the workmen of the bones being human, and it was not till several weeks after their discovery that they were recognized as such by Dr. Fuhlrott. By this time many of the bones were dispersed. The skull-cap (Fig. 4), and a few other bones remained, and were at once placed in security. No other animal remains, with the exception of a bear's tooth, were found in the cave. Consequently there are no collateral circumstances, neither archæological, geological nor stratigraphical, which can help to assign a date to the Neanderthal skeleton, so that its antiquity has been determined solely from the osteological characters of the skull-cap. These, however, were found

to be so remarkable in character that, when first exhibited at a scientific meeting at Bonn, doubts were expressed by several naturalists as to whether they were really human. The cranium was of great size and thickness, and had a long elliptical form, a low, retreating forehead, excessive development of the frontal sinuses, and a great projection of the occipital

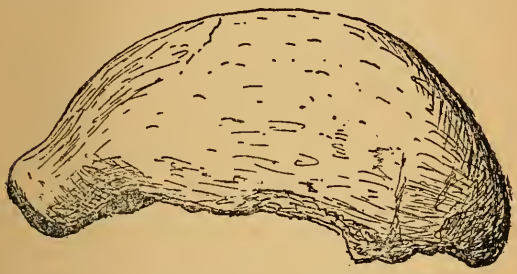


FIG. 4.—Side view of the Neanderthal skull-cap (½). (*After Huxley.*)

region. The sutures were nearly obliterated, and the line of the frontal suture was marked by a slight ridge. The principal dimensions of the skull were as follows:

	mm.	
Antero-posterior diameter	200	
Transverse do.	144	
Frontal (min.)	106	
Do. (max.)	122	
Horizontal circumference	590	(571 ?)
Cephalic index	72	

With regard to this skull Professor Huxley, writing in 1863, says :

" There can be no doubt that, as Professor Schaaffhausen and Mr. Busk have stated, the skull is the most brutal of all known human skulls, resembling those of the apes not only in the prodigious development of the superciliary prominences and the forward extension of the orbits, but still more in the depressed form of the brain-case, in the straightness of the squamosal suture, and in the complete retreat of the occiput forward and upward, from the superior occipital ridges."

The above rapid sketch of a few of the more outstanding discoveries, bearing on the antiquity of man, shows that the science of anthropology had as yet only attained a footing in the minds of a few thoughtful men, who had been able to divest themselves of hereditary prejudices. Professor Huxley, writing in 1894, in his preface to the re-publication of *Man's Place in Nature*, thus writes :

" Among the many problems which came under my consideration, the position of the human species in zoological classification was one of the most serious. Indeed, at that time, (*circa* 1857) it was a burning question in the sense that those who touched it were almost certain to burn their fingers severely. It was not so very long since my kind friend Sir William Lawrence, one of the ablest men whom I have known, had been well-nigh ostracized

for his book *On Man*, which now might be read in a Sunday-school without surprising anybody; it was only a few years since the electors to the chair of Natural History in a famous northern University had refused to invite a very distinguished man to occupy it because he advocated the doctrine of the diversity of species of mankind, or what was called 'polygeny.' Even among those who considered man from the point of view not of vulgar prejudice, but of science, opinions lay poles asunder. Linnæus had taken one view, Cuvier another; and, among my senior contemporaries, men like Lyell, regarded by many as revolutionaries of the deepest dye, were strongly opposed to anything which tended to break down the barrier between man and the rest of the animal world."

This was the state of matters when the *Origin of Species* appeared, and produced a profound sensation among all thinking people. In this work Darwin traced the origin of man through a series of intermediate forms back to protoplasm, without the intervention of repeated cataclysms and creative dramas, as was generally held by the earlier geologists. "As all the living forms of life," he writes, "are the lineal descendants of those which lived long before the Cambrian epoch, we may feel certain that the ordinary succession of generation has never once been broken, and that no cataclysm has desolated the whole world" (*loc. cit.*, p. 428).

Another work, which called forth almost as much hostile criticism as the *Origin of Species*, was Huxley's *Man's Place in Nature*, published in 1863. In this little volume the author finally shattered the hypothesis which assigned man's origin and civilization to a *sui generis* code outside the ordinary laws of the organic world.

It was not, however, till after the publication of Lyell's *Antiquity of Man* (1863) that anthropology took its place among the great departments of scientific knowledge.

In my recent lectures on *Palæolithic Man in Europe*, 1912 (p. 101), I thus summed up the immediate results which followed the publication of Lyell's book:

"Henceforth a new impetus was given to the study of the science of anthropology by the conviction that the meanest traces of man's early career were actually more important materials for a history of humanity than all the treasures that had been collected from the ruins of the greatest empires of the historic world. The wide morphological gap between man and the other animals still living suggested a correspondingly long period for man's development, in the course of which it was expected that some evidence of the stages through which he had passed might have become stereotyped in the geological records. Where to find and how to interpret such materials were now the chief problems at issue; and to their solution the

savants of all countries braced themselves with an energy that augured final success. Societies were founded in London, Paris and other centres of intellectuality, for the express purpose of following up the new-found trail of humanity; and to popularize and disseminate their doctrines, numerous periodicals and special works were published. One periodical may be specially mentioned, viz. *Les Matériaux pour l'histoire primitive et naturelle de l'Homme*—which, since it was started by G. de Mortillet, had been the means of giving wide publicity to the new doctrines. In the year 1865, at a special meeting of the Italian Society of Natural Science held at Spezzia, was founded the 'Congrès International d'Anthropologie et d'Archéologie préhistoriques,' the first meeting of which was held in the following year at Neuchâtel. Subsequent meetings have been held at Paris (1867), London, (Norwich) (1868), Copenhagen (1869), Bologna (1871), Brussels (1872), Stockholm (1874), Buda-Pesth (1876), Lisbon (1880), Paris (1889), Moscow (1892), Paris (1900), Monaco (1906), and Geneva (1912). The published proceedings of these Congresses contain the most complete records of the progress of the science, especially as regards Europe. After the cloud of scepticism which enveloped its early and evolutionary stages had been swept aside, anthropology found a footing at the British Association for the Advancement of Science, at first as a sectional department, but since 1884 it be-

came expedient to devote a special section for the exclusive consideration of its doctrines. At the same time it cannot be denied, that the negative side of the evolution problem, which had so long found a refuge among religious bodies under the false assumption that their views had the imprimatur of the Biblical narrative of creation, had still its advocates, for it seems that no amount of evidence can eradicate the rooted objections of some persons to the doctrine of evolution."

The revolution thus effected in current thought with regard to the origin of man, though mainly due to the publication of the works of the eminent writers above mentioned, derived a contributory element from the science of geology. Early in last century geologists were rather inclined to the opinion that the world had passed through a series of destructive cataclysms, each of which had been succeeded by an entirely new flora and fauna. These successive world-revolutions were supposed to be due to the direct interposition of an all-ruling Providence; and hence, for a time, these geological speculations rather strengthened the so-called orthodox opinion, that the present order of things was the final stage of the imaginary dramas of special creations, in which the creation of Man stood forth as the last and crowning achievement. But a fuller acquaintance with fossil remains soon rendered the theory of cataclysms untenable. In other words, the

organic continuity of life throughout the successive geological periods was proved and accepted.

The influence of this drastic clearance of antiquated machinery in geology soon extended to the collateral sciences, and the first to benefit from the improved methods was archæology.

The discoveries of Kjøkkenmøddings (Kitchen-middens) in Denmark and lake-dwellings in Switzerland, with the vast and varied wealths of prehistoric materials which they brought to light, began now, also, to attract universal attention. Owing to the more rigid and scientific methods adopted in collateral researches, archæology proper, independent of its new-born palæolithic phase, had acquired a wider significance than formerly. The common borderland between geology and anthropology was being better understood, especially as regards the glacial period. Above all, the antiquarian dilettantism of earlier days and the unbending attitude of so-called orthodoxy began to have less influence on the philosophic mind, so that the new doctrine fell on a somewhat congenial and receptive soil in which it soon took permanent root.

CHAPTER III

EVIDENTIAL MATERIALS (*continued*)—FURTHER DISCOVERIES IN BRITAIN, BELGIUM, AND FRANCE

HALF a century has now passed since the theory of organic evolution captured the philosophic mind of the day, and at once placed the science of anthropology into the position of being one of the most fascinating of intellectual pursuits. Our object in the present chapter is to give some idea of the progress that has been made during this long interval, in investigating the history of humanity and civilization from the new standpoint. To condense the story of half a century's explorations and discoveries over a wide field by a crowd of eager and enthusiastic workers who, probably then for the first time, realized the grandeur of the conception of the uniformity of nature, is an effort which calls for some indulgence on the part of the reader. We will begin the task by a rapid survey of a few of the principal Palæolithic discoveries made in Western Europe up to the present time—for we are not yet in a position to isolate Britain from the Palæolithic area on the Continent.

Britain.—One of the most important archæological achievements in Britain was the complete excavation of Kent's Cavern, under the superintendence of Mr. Pengelly, F.R.S.,

and a scientific committee appointed by the British Association. The work was begun in March 1865, and continued without interruption till June 1880, at an expense of £1963.

The industrial remains found in Kent's Cavern, below the bed of stalagmite, calculated to throw light on the culture and civilization of its inhabitants, were made of stone, bone, and horn (probably that of the reindeer), and may be thus briefly described. Among objects made of stone were tongue-shaped, oval and triangular tools of flint and chert; worked flakes, scrapers and cores of flint; also a few hammer-stones, one of which was shaped like a cheese. Of bone, or horn, there were pins, awls, barbed harpoons, and a neatly formed needle, precisely similar to analogous objects found in the rock-shelter of La Madeleine (France). From the style of workmanship and form of these relics, especially the harpoons and needle, there can be no doubt that their original owners were contemporary with the late Palæolithic inhabitants of the caves of the Dordogne. On the other hand, the tongue-shaped implements (*coup-de-poing*) were found in a lower stratum, thus indicating an earlier date of occupancy, probably the Moustérien epoch.

Among the fauna represented in Kent's Cavern were mammoth, woolly-haired rhinoceros, reindeer, lion, bear, hyæna, Irish elk, horse, urus (wild ox), etc. But perhaps the most interesting among the extinct animals

was the large sabre-toothed tiger (*Machairodus latidens*) represented by a few teeth.

A human jaw, said to have been found below the sheet of stalagmite, was described at the meeting of the British Association, held last year (1912) at Dundee. It seems strange that such an important human bone should have been hitherto overlooked.

Above the sheet of stalagmite which covered the Palæolithic deposits containing the industrial remains and bones of extinct animals was a layer of black earth or mould, interspersed among a mass of fallen blocks from the roof, in which were found a number of objects belonging to different phases of the later periods. Among them were flint flakes, cores and chips, spindle-whorls, a socketed bronze knife, broken weaving combs, pottery (some of which were Roman), etc., all showing that the cave had been frequented in Neolithic and Proto-historic times. The intervention of the stalagmitic layer between the débris of the two civilizations, the deposition of which implies a long, though somewhat uncertain, time, renders it impossible to trace any evolutionary connection between the people who frequented the cave before and after its occurrence. Hence to find a satisfactory explanation of the *hiatus* in human civilization thus suggested is one of the most controverted problems of the day, to which we will return later on.

About the year 1875 Professor Boyd Dawkins and the Rev. J. Magens Mello carried

out a series of investigations in the Cresswell caves, Derbyshire, which showed that they were the abodes of a colony of Palæolithic races of the Magdalénien epoch. Among the industrial remains which these people left behind them were the following objects—well-formed flint flakes, borers and engravers; chisels, awls and a neatly-made needle of bone; a flat piece of bone ornamented with the incised head of a horse, and another oval piece with a serrated edge. These relics are quite sufficient to prove that the inhabitants of the Cresswell caves were contemporary with, and belonged to, the same race as the later Palæolithic men of Kent's Cavern. It may, however, be noted that in one or two caves a lower stratum of cave-earth contained osseous remains of the hyæna, bison, hippopotamus and the small-nosed rhinoceros—all representatives of a warm climate. But along with them there were no remains of man or his works.

According to Dr. Buckland the Hyæna Den of Kirkdale contained bones of the hyæna, representing some 300 individuals, and next in point of numbers came those of the ox and deer, but there was no evidence of the presence of man at any time in this cave.

Several caves in the south-west of England and Wales yielded bones of nearly all the extinct mammalia associated with flint implements. In Bosco's Den, one of the Gower Peninsula caves, no less than 750 shed antlers

of reindeer were found. In another (Long Hole) the fossil remains included *Elephas antiquus* and *E. primigenius*, two species of rhinoceros, bear, lion, hyæna, bison and reindeer, associated with well-formed flint flakes. Similar discoveries were made in the famous Hyæna Den of Wookey Hole, where the fossil remains of the animals of the period were counted in hundreds, the most numerous being hyæna, horse, woolly rhinoceros, reindeer, mammoth and Irish elk.

No fossil remains of man have hitherto been found in caves frequented by Palæolithic races in South Britain, with the exception of a female skeleton in the Paviland cave, described by Dr. Buckland, a molar tooth in the cave of Pont Newydd in Wales, and the hitherto overlooked jaw from Kent's Cavern. In France and other parts of the Continent the remains of fossil cave-men have been frequently met with.

The most rational explanation that can now be given for the presence of the bones of extinct animals in such large numbers on these rocky shores of the west of England and Wales, is that the English Channel was then mostly a well-watered plain, sufficiently rich in vegetation to attract herds of herbivorous animals, and which therefore soon became the happy hunting-ground for the great extinct carnivores. Except in Kent's Cavern, there is no decided evidence that man was a frequent visitor of the caves during the inter-glacial warm period which followed that

of maximum glaciation. The early Palæolithic nomads appeared to have confined their wanderings to the river valleys, living on fruits, roots and the smaller animals.

Although some of the Pleistocene fauna, including the mammoth, reindeer and Irish elk, found their way into Ireland, no evidence of the presence of Palæolithic man in that island has yet been discovered. This may be accounted for by alterations in the relative level of sea and land. The Irish Channel being thirty-eight fathoms deep, while that between England and the Continent is only twenty fathoms, it would follow that the former would become sea, during a process of gradual submergence, long before the latter. When the British Isles stood at their maximum elevation continental mammals could roam as far as the Atlantic without any water impediment, but as the gradual submergence progressed the Irish Channel would be first blocked against them; so that for a considerable interval of time immigrants could still come to Britain but not to Ireland. A similar result would follow on the occurrence of an elevation of land after a state of submergence. From researches carried on some time ago in the cave of Balynamintra, County Waterford, it has been shown that the Irish elk was contemporary with Neolithic man in that neighbourhood.

In 1883 parts of a human skeleton were discovered, while excavating the Tilbury Dock, in a sandy stratum, at a depth of

thirty-four feet from the present surface of the river bank. Professor Owen described these bones as those of a Palæolithic man, in a brochure entitled *Antiquity of Tilbury Man*. But his opinion has been questioned, on the

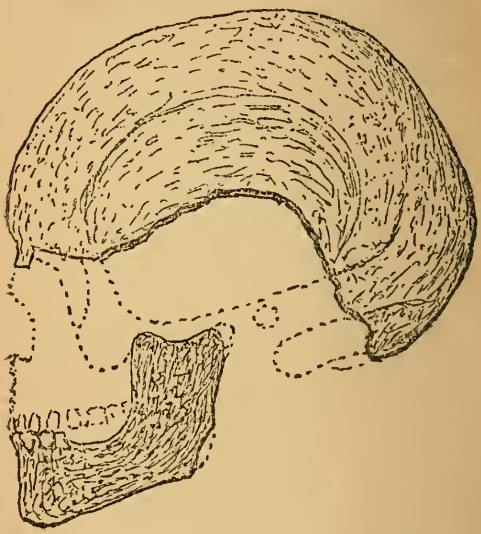


Fig. 5.—Profile of the skull of Tilbury man (¼). (*After Keith.*)

ground that the osseous characters of the skull were not sufficiently pronounced to assign this individual to any phase of the prehistoric period (Fig. 5). In these circumstances the only safe conclusion is that of Mr. Spurrell, who relegates it to a transition period between

that of the cave-men and Neolithic races—a conclusion which its stratigraphical position justifies (see Chap. X).

Another human skeleton was found in 1888, in the terrace gravels at Galley Hill, Kent, but for some inscrutable reason it was not reported on, or submitted to expert opinion, till 1895. The bones were then described at the Geological Society of London by Mr. E. T. Newton, F.R.S., as those of an individual who was contemporary with the people who used the flint implements disinterred from the terrace gravels—implements which undoubtedly possess the usual characters of "palæoliths." In the discussion which followed Dr. Newton's conclusion was questioned on the ground of insufficient evidence to prove that the skeleton had not been a more recent burial.

Dr. Garson thus summed up the special characters of the skeleton: "The short stature, the very dolichocephalic skull, the prominent glabella and superciliary ridges, and the well-marked ridges of the skull generally, the absence of prominence of the chin, and the large size of the last molar tooth, which was as large as, if not larger than, the first molar (Fig. 6). The large size of the head of the femur was also peculiar."

Under these circumstances it is manifest that no important deductions can be founded on the anatomical characters of the Galley Hill skull, beyond the fact that, like the other well-attested Quaternary skulls, it is

dolichocephalic, and shows similar peculiarities, both as regards the receding forehead and the angular prominence of the occiput. It is, however, a more highly developed skull than the more recently discovered specimens of the Neanderthal-Spy race, such as those

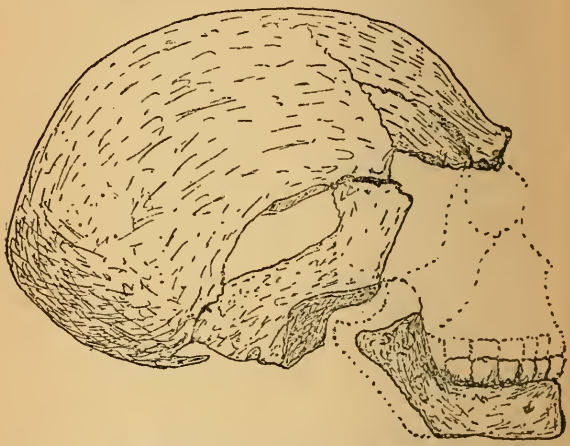


FIG. 6.—Side view of the Galley Hill skull (⅓). (*After E. T. Newton.*)

of Chapelle-aux-Saints, Moustier, Krapina, La Quina, etc.

The discovery of a Palæolithic human skull and mandible in flint-bearing gravel near Piltdown Common, in Sussex, was the subject of a recent communication by Mr. C. Dawson and Dr. A. Smith Woodward to the Geological Society of London on December 18, 1912.

The skull was originally found by workmen, broken up by them, and most of the pieces thrown away on the spot. As many fragments as possible were subsequently recovered by the authors, from which the skull was restored. Half of a human mandible was found in a patch of undisturbed gravel by Mr. Dawson close to the place where the skull occurred. From the abstract in the Society's Proceedings are taken the following descriptive extracts :

"Two broken pieces of the molar of a Pliocene type of elephant and a much-rolled cusp of a molar of *Mastodon* were also found, besides teeth of *Hippopotamus*, *Castor*, and *Equus*, and a fragment of an antler of *Cervus elaphus*. Like the human skull and mandible, all these fossils are well mineralized with oxide of iron—many of the water-worn iron-stained flints closely resemble the 'eoliths' from the North Downs, near Ighthan. Mingled with them were found a few Palæolithic implements of the characteristic Chellean type. The gravel at Piltdown rests upon a plateau eighty feet above the river Ouse, and at a distance of less than a mile to the north of the existing stream.

"The skull (which unfortunately lacks the bones of the face) exhibits all the essential features of the genus *Homo*, with a brain capacity of not less than 1070 c.c., but possibly a little more. It measures about 190 mm. in length from the glabella to the inion, by 150 mm. in width at the widest part of the

parietal region; and the bones are remarkably thick. The forehead is steeper than that of the Neanderthal type, with only a feeble brow-ridge; and the conformation of the occipital bone shows that the tentorium over the cerebellum is on the level of the external occipital protuberance, as in modern man. Seen from behind the skull is remarkably low and broad, and the mastoid processes are relatively small. The right mandibular ramus is nearly complete to the middle of the symphyses, lacking only the articular condyle and the upper part of the bone in advance of the molars. The horizontal ramus is slender, and, so far as preserved, resembles in shape that of a young chimpanzee (*Anthropopithecus niger*). The lower symphysial border is not thickened and rounded, as in man, but produced into a thin inwardly-curved flange, as in the apes. The ascending ramus is comparatively wide, with extensive insertions for the temporal and masseter muscles, and a very slight sigmoid notch above. Molars 1 and 2, which occur in their sockets, are typically human, though they are comparatively large and narrow, each bearing a fifth cusp. The socket of molar 3 indicates an equally large tooth, placed well within the ascending ramus of the jaw. The two molars have been worn perfectly flat by mastication, a circumstance suggesting that the canines resembled those of man in not projecting sensibly above the level of the other teeth. The weakness of the mandible, the slight

prominence of the brow-ridges, the small backward extent of the origin of the temporal muscles, and the reduction of the mastoid processes, suggest that the specimen belongs to a female individual, and it may be regarded as representing a hitherto unknown genus and species, for which a new name is proposed.

"The authors conclude that the Piltdown gravel-bed is of the same age as the contained Chellean implements, which are not so much water-worn as most of the associated flints. The rolled fragments of molars of the Pliocene elephant and *Mastodon* are considered to have been derived with the flints from older gravels; while the other mammalian remains and the human skull and mandible, which cannot have been transported far by water, must be assigned to the period of the deposition of the gravel-bed itself. The remoteness of that period is indicated by the subsequent deepening of the valley of the Ouse to the amount of eighty feet."

The above conclusion seems to the present writer the most rational deduction from the facts, notwithstanding that the discussion elicited a conflict of opinion—some regarding the skull as belonging to the same age as the mammalian remains, which were admittedly Pliocene. As an undoubted human fossil of the River Drift period in Britain, the importance of the Piltdown skeleton, as a link in the evolution of humanity, cannot be over-rated (see Chap. IV, p. 70).

No other researches within the British area

have added much to our knowledge of Palæolithic civilization since the exploration of Kent's Cavern. Numerous specimens of the so-called "palæoliths" are being collected from the implement-bearing gravel-pits of the River Drift deposits in various localities throughout the south of England. Also, a few old land-surfaces have been discovered, especially within the Thames valley, showing evidence of having been used as workshops for the manufacture of flint implements.

The discoveries of Mr. Worthington G. Smith at Caddington, near Luton, have disclosed two Palæolithic land-surfaces, one above the other, with implements indicating different stages of culture, from the *coup-de-poing* type down to late Moustérien instruments and tools.

Similar evidence is supplied by another "floor," explored by Mr. F. C. J. Spurrell at Crayford, which had the exceptional feature of preserving the actual flakes that were struck off in trimming flint nodules into shape. In one instance the implement was accidentally broken before it was finished, and Mr. Spurrell recovered the two broken portions, as well as the discarded flakes, and with remarkable ingenuity he has replaced the whole into their original position. These interesting relics are exhibited in the Natural History Museum at Kensington. The "workshop" was formed in deposits of brick-earth and sand, at a height of seventy feet above sea-level, and thirty-six feet from the present surface of the river.

Belgium.—Notwithstanding the extent and notoriety of Schmerling's early researches, it was not till the latter part of 1863, when Lyell's *Antiquity of Man* had attracted universal attention, that the Belgian authorities became alive to the importance of their caverns. Some of the leading savants, stung with reproach for having left it to foreigners to recognize the true significance of their famous countryman's early discoveries, conceived the project of exploring the caverns on the banks of the Meuse, especially those situated along its tributaries, the Lesse and Molignée, on a scale commensurate with the acknowledged importance of the subject. The Government readily sanctioned the project and supplied the necessary funds. M. E. Dupont, Director of the Royal Museum of Natural History, was appointed to carry out the investigations. Active operations were begun in 1864 and continued for upwards of seven years, during which some sixty caverns were more or less explored. Nearly 40,000 bones were examined and classified under the various species of animals they represented—while not fewer than 80,000 worked flints were collected. Judging from the work done at Furfooz in clearing out the *Grotte des Nutons* and the *Trou du Frontal*, on the bank of the river Lesse—the only two stations which the present writer had an opportunity of inspecting—the labour entailed in the excavations of so many caverns must have been very arduous.

Dr. Dupont classified all the relics found in these caves as follows :

1. *Âge du Mammoth.*—The principal relics associated with the mammoth were spear-points, a doll-like object of reindeer horn (suggesting an attempt at modelling the human form), a few articles showing efforts of rudimentary carving, and a *bâton de commandement*, also ornamented. These objects were found to be lowest in the cave débris and coeval with the time when the swollen rivers occasionally overflowed into the caves and left stratified beds of gravel or mud on their floors.

2. *Âge du Renne.*—The reindeer period coincided with the time when the rivers, by excavating their valleys more deeply, ceased their fluviatile deposits in the caverns, and so left their floors above the present highest flood-marks. The portion of their contents representing this age was characterized by angular blocks mixed with brick-earth. Of the fauna of the previous age—mammoth, woolly rhinoceros, Irish elk, hyæna, cave-lion and cave-bear—only the reindeer still survived. The industrial remains consisted of a few dart-points of horn, a bone needle, some perforated shells, perforated stone ornaments and flint flakes. The flint relics are said to manifest greater skill in their manufacture than in the previous age, especially in the process of secondary chipping.

3. *Époque actuelle.*—The superficial blackish débris—the accumulated dust of more recent

times—M. Dupont assigned to the period now in progress, when only the fauna of Neolithic times are met with, the reindeer having also vanished from the locality. The sepulchral remains of an extremely brachycephalic race were found in the *Trou du Frontal*, and associated with them were fragments of pottery, both of which must be assigned to Neolithic races, who also haunted these retreats (see Chap. X, p. 242).

In addition to the cave relics there is in the Brussels Museum another collection of roughly chipped flints from Mesvin, near Mons. These were found in a gravelly stratum resting immediately over tertiary deposits, but below two distinct beds of mud (*limon*). The special interest attached to them lies in the fact that in the same stratum were found remains of the following Quaternary fauna, viz. mammoth, woolly rhinoceros, cave-bear, cave-lion, Irish elk, reindeer, bison, horse and snails (*Helix ericetorum*). Neither of the two earlier elephants nor the hippopotamus appears to have been represented (*Congrès d'Anthropologie et d'Archéologie préhistoriques*, 1872, p. 265).

M. A. Rutot, Conservator of the Royal Museum of Natural History in Brussels, a distinguished geologist and a militant advocate of the theory that "eoliths" are human implements, has propounded a new system of classification which aims at proving, by various sections, especially one at Helin in the valley of the Lys, that the Chelléen epoch is

not the earliest in Europe which has yielded remains of human industry. In his classification (*Le Préhistorique dans L'Europe Centrale*) he tabulates below the Chelléen, deposits called *Strépyien, Mesvinien, Reutelo-Mesvinien ou Mafflien*, and *Reutelien*. The *Elephas antiquus* is made to be contemporary with the last three deposits, and the mammoth appears on the scene with the *Strépyien*. Besides, M. Rutot has altered de Mortillet's well-known classification by changing the nomenclature without almost any change in the substance, thus bringing unnecessary confusion into the subject. He founds his theory upon the stratigraphical position of the objects and the degree of rudeness in their manufacture.

Among the human remains found in the Belgian caverns are two finds of capital importance, viz. the *Naulette* mandible and two skeletons known as *Les Hommes de Spy*. The former (Fig. 7) was found at a depth of 4·50 metres in the débris of the *Trou de la Naulette*, near Dinant, and though only a fragment, it presents certain characters which differentiate it from the corresponding bone in modern races, notably in the absence of the chin and the size of the socket for the third molar tooth. The latter will be discussed in the next chapter.

France.—On entering the Dordogne district we are on classic ground as regards the home of Palæolithic man in France. Here, on the rocky banks of the Vézère, are some thirty caves and rock-shelters, which have yielded

an immense assortment of handicraft work illustrating his industries, occupations and amusements. With the exception of a few sporadic finds, referred to in last chapter, but which had little effect on current opinion, it was from the discoveries in the caves of this romantic valley that anthropologists first

FIG. 7.—Two views of the Naulette Jaw showing absence of chin and large socket of molar 3 (⅔). (*After Dupont.*)

realized the significance of the old-world civilization which has bequeathed to mankind so many specimens of their skill in engraving, sculpture and painting.

Edward Lartet, an ardent palæontologist, who, in 1861, gave publicity to the fact that, in the cave of Aurignac, human bones and manufactured objects were associated with

a number of extinct animals, had his attention directed to the Dordogne by seeing, in the hands of a friend in Paris, a carbonized bone embedded in a piece of calcareous breccia which had been found in that locality. This was in 1862, and almost immediately Lartet went to see the spot where the fossil bone had been discovered, and made some excavations merely to gratify his own curiosity. Here he became associated with Henry Christy, a generous Englishman who became intensely interested in such discoveries. These two explorers arranged investigations on a large scale—Christy paying all expenses. They began operations in the now famous station of Les Eyzies, the spot where the Paris carbonized bone had been found, and pushed on the work with such activity that before the end of 1863 the whole débris was cleared out, and the relics scientifically examined and classified. Encouraged by their success, they then extended their explorations to the caves of Le Moustier, Gorge d'Enfer, La Madeleine, Laugerie Haute and Laugerie Basse. While these investigations were in progress Messrs. Christy and Lartet conceived a scheme for the exploration and description of the antiquities of Aquitaine, and at once set about collecting materials for a great work on the subject, under the title of *Reliquiæ Aquitanicæ*. But, unfortunately, just after the first fasciculus had been placed in the hands of the printer, Mr. Christy died (May 4, 1865). Henceforth the labour of editing the

projected work fell to M. Lartet, and, to enable him to do so effectually, Mr. Christy's trustees supplied the funds. But, alas! in January 1871, M. Lartet also died, before the work was finished. Ultimately it was carried out and published in 1875, by a number of Christy's friends, under the editorship of Professor Rupert Jones. *Reliquiæ Aquitanicæ* is largely made up of essays on the various phases of the culture of the reindeer hunters, together with descriptions of the customs of modern savages, supposed to throw light on the early inhabitants of Aquitaine. The chief value of this magnificent work now lies in its eighty-seven plates of illustrations drawn on a large scale. From what it contains we can imagine how much archæological science lost by the premature death of its original authors.

The early discoveries of Lartet and Christy in the Dordogne caves, and the scientific recognition of the strange flint objects found by M. Boucher de Perthes in the gravels of the Somme valley as the genuine tools of an ancient race of inhabitants, coming so prominently before the scientific world much about the same time (1858–1863), roused a spirit of research among French prehistorians, which has ever since continued at an accelerated pace. It was speedily ascertained that their country was exceptionally rich in vestiges of the old Aquitainian civilization, brought to light from the caves and rock-shelters of the Vézère valley. In 1908 M. Déchelette

estimated the number of analogous stations, discovered and described in France up to date, at 118; but their number has considerably increased since then. In addition to the antiquarian results from these sheltered habitations must be reckoned the discoveries in the implement-bearing gravels, which are scattered so profusely throughout the alluvial deposits of the principal river basins in the middle and southern portions of France—Seine, Somme, Loire, Garonne, Adair and Rhone. The assortment of objects showing human workmanship, in the form of implements, weapons and ornaments, collected from these inhabited sites and alluvial deposits, now forms a remarkable feature of all the French archæological museums, especially the Museum of National Antiquities at Saint-Germain. In fact this splendid museum was virtually founded for the special purpose of giving accommodation to the relics pouring in from all quarters, as a consequence of the rise of the new science of anthropology and prehistoric archæology. When the great collections of the Old World civilizations, which now adórn the halls of the Louvre, Hôtel Cluny and the Palais des Thermes, were organized, prehistoric archæology was scarcely known, and so there was little space for this department in any of these museums. To remedy this defect the old Château of Saint-Germain was restored and fitted up as a special museum for the prehistoric antiquities of France.

Characteristic remains of the Palæolithic civilization have been found in numerous localities throughout Central Europe, among which the following may be noted:

Chancelade, Combe-Capelle, La Ferrassic, La Mouthe, Combarelles, Cap-Blanc and La Micoque, all in the Dordogne district. La Quina, Petit Puymoyen, Placard and Montgaudier (Charente); Chapelle-aux-Saints (Corrèze); Altamira (north-east of Spain); Niaux (Ariège); Marsoulas (Haute-Garonne); Lorthet (Haute-Pyrenécs); the rock-shelter of Schweizersbild, near Schaaffhausen; the Grimaldi caves near Mentone, and the station of Krapina (Croatia).

In some of these stations a new phase in the culture of the Palæolithic people has been recently brought to light, viz. the habit of adorning the walls of the caves by figures of animals drawn, sometimes in incised lines, or painted in different colours, and sometimes sculptured in bas-relief. Over a score of these wall-painted caverns are now on record, the earliest, that of Altamira, having been discovered in 1875, but for upwards of ten years it remained under a suspicion that the drawings were not of the Palæolithic period. Ultimately other analogous discoveries came to light in the caves of La Mouthe, Pair-non-Pair, Marsoulas, Combarelles, etc., which soon dispelled the doubt raised about the genuineness of the Altamira paintings. Now Altamira holds a pre-eminent position as one of the greatest marvels of Palæolithic art.

Among the river deposits which have yielded relics of man's works of special interest are the stations of Chelles and Levallois, near Paris, and the gravels of Mauer, near Heidelberg.

The large amount of archæological materials recovered from these and other stations, too numerous to be here mentioned, represent a vast period of time covering at least one inter-glacial warm period, and a subsequent recrudescence of another ice age, with its accompanying Arctic climate. On the retreat of the last *mer de glâce* the climate became gradually ameliorated, and ultimately merged in that of the historic period. Coincident with these changes in the climate and physical geography of Europe since man appeared on the scene, the flora and fauna of the country, which are so dependent on a uniform environment for the stability of their racial characters, could not fail to have been greatly modified. The result was the bringing together into Central Europe of a number of species of animals representing faunas so widely apart as those of subtropical and Arctic regions. But this intermingling of animals from different quarters did not take place in a haphazard manner, but was effected in strict accordance with the exigencies of the cosmic environment. As man appeared in Western Europe during a warm inter-glacial period and lived on through a subsequent climate of Arctic severity, we have evidence to show that a succession of animals adapted for such climatal changes were his contemporaries.

Thus in the lowest deposits at Chelles the fauna included *Elephas antiquus, E. meridionalis, Hippopotamus major, Rhinoceros merckii, Trogontherium,* cave-bear and cave-hyæna. These animals were survivals of the Pliocene Age, and their presence in any locality indicates a warm climate.

The same species of animals have also been found in the lower deposits of the valleys of the Somme and Thames. When, however, we examine the animal remains of the inhabited caves of the Moustérien epoch, we find that the first five of the above-named animals were no longer represented, but instead of them were remains of the mammoth, woolly-haired rhinoceros, cave-bear and cave-hyæna.

During the earlier part of the Magdalénien epoch the fauna was chiefly represented by the mammoth (sparingly), reindeer, horse, wild cattle, etc. But the mammoth soon left the neighbourhood, retiring to Siberia, doubtless with the hope of adapting his hereditary *modus vivendi* to Arctic conditions of life. The experiment was, however, unsuccessful, as he soon succumbed to the severity of the climate, and, sad to relate, the last lingering individuals of the species met the fate of extinction by being frozen in ice, where their carcases are still to be found. With the final amelioration of the climate the reindeer also disappeared from Central Europe; and so the Palæolithic Age and its unique civilization came to a close in Europe.

CHAPTER IV

PALÆOLITHIC TYPES OF MAN—THEIR CULTURE AND CIVILIZATION

Of the comparatively large number of the fossil remains of man hitherto discovered and reported on by experts, only a few are of capital anthropological value. But, after eliminating from the records all doubtful or incomplete specimens, there remains a sufficient number to show that there were five or six human types living in Western Europe during some portion of the Pleistocene period, without counting the brachycephalic people who are supposed to have commenced to immigrate into Europe, during or about the close of the last phase of Palæolithic civilization.

1. *Man of the River Drift Period.*—Until the discovery of the Piltdown human skull and mandible, described in last chapter, the few osseous remains of the people who inhabited Britain and other parts of Europe when the swollen rivers were excavating their present valleys were too fragmentary to give much information as to their physical characters. Portion of a skul was found in brick-earth at Bury St. Edmunds, and figured in *Man the Primeval Savage*, but all that could be affirmed of it was that it was greatly elongated and especially developed in the occipital region. The flint implements associ-

ated with it were Acheuléen, or early Moustérien, types. Hence that individual, without straining fair presumptive evidence, might be assigned to the Neanderthal-Spy race. Then the Galley Hill skeleton must be set aside for the present, as it still lies under the cloud of doubt which was raised against the hypothesis that it was contemporary with the deposition of the gravels in which it was found. Objections on various grounds have been raised against nearly all the human remains found in alluvial deposits on the Continent, such as those of Grenelle, Clichy, Truchère, Olmo, Eguisheim, Brux, Brünn, Podbaba, etc.

As fabricators of the *coup-de-poing* type of implement, these River Drift men roamed along the river valleys and primeval forests of the south of England and Central Europe, which then abounded in subtropical animals and fruits sufficient to supply them with sustenance, without much labour.

It remains to be seen whether the Piltdown specimen of humanity is to be assigned to an earlier date than Chelléen (which was undoubtedly an inter-glacial epoch—the second, according to Professor James Geikie), on anatomical or geological grounds, both of which are at present undecided.

The Chelléen deposits are, of course, much older than the Moustérien epoch—how much older may be estimated by the time it has taken for a subtropical climate to veer round to one of Arctic severity, with a corresponding change in their concomitant faunas.

Since the MS. of this little book was placed in the hands of the publishers the full report of the Piltdown discovery has appeared (*Quart. Journ. Geolog. Soc.*, Vol. LXIX). It consists of a remarkably precise description, with copious illustrations, of the human bones and their associated mammalian remains and

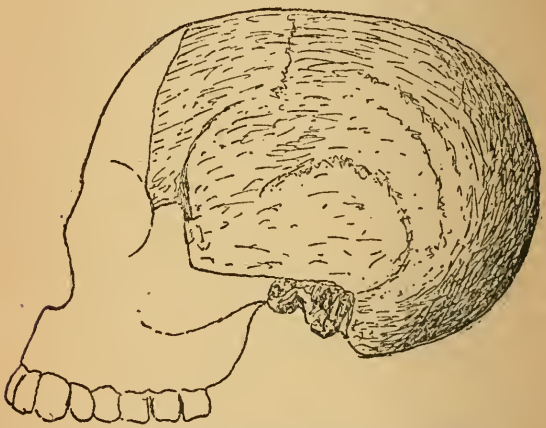


FIG. 8.—Side view of *Eoanthropus dawsoni* (½). (*After Smith Woodward.*)

flint implements. Owing to the number of points in which the Piltdown skull differs from other known types of fossil man, Dr. A. Smith Woodward has given this specimen of humanity the name of *Eoanthropus dawsoni*, in honour of the discoverer. By the kind permission of Dr. Woodward I have the pleasure of representing an outline of the

restored skull, the position of the absent bones of the face being shown in white (Fig. 8). Also, for comparison with a sketch of the mandible (Fig. 9 B), there is one of a young Chimpanzee (A), from which the strong

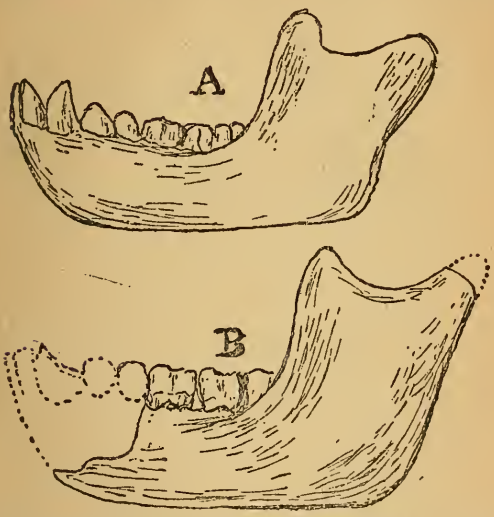


Fig. 9.—Mandible of a young Chimpanzee (A) and of the Piltdown Woman (B) (½). (*After Smith Woodward.*)

resemblance between them will be seen at a glance.

As to the flints, I do not deny the possibility of their being of pre-Chelléen date, as undoubtedly man produced ruder implements before he succeeded in manufacturing the highly finished tools of the *coup-de-poing*

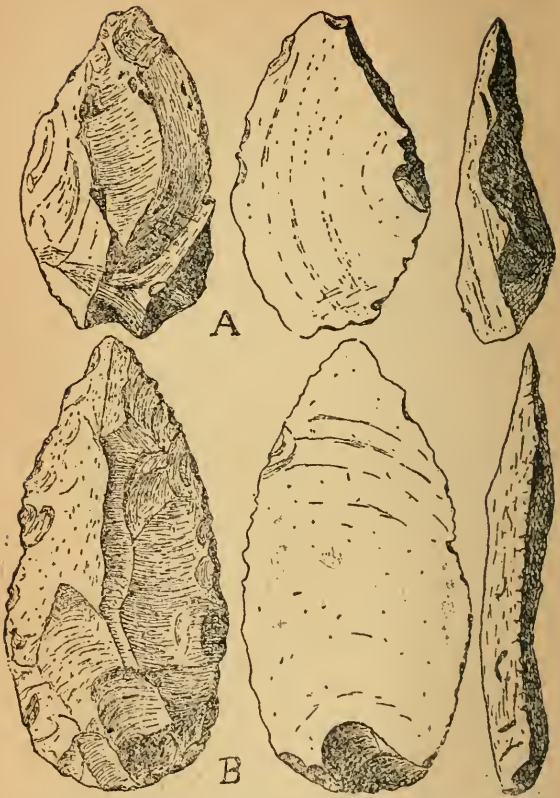


FIG. 10.—Three views of a Piltdown worked flint (A), compared with three views of one from Le Moustier ($\frac{1}{2}$).

type; but it is a remarkable fact that the three specimens figured on Pl. XVI may be claimed as characteristic forms of the Moustérien epoch. On Fig. 10 the outline of one of the Piltdown series (A) is placed beside one (B) from the cave of Le Moustier (*Reliq. Aquitanicæ*, A. Pl. III). The operator in each case first chipped a portion of the surface of a selected nodule, then with one well-directed blow he struck off a large flake, having one surface worked and the other flat. This method was invented posterior to the use of the *coup-de-poing*, and the resulting tool being abundant in Le Moustier, it has been regarded as characteristic of the Moustérien epoch. As a workable tool it was found to be an improvement on the former, having a sharp cutting edge and requiring less labour in its manufacture. Besides, those finely chipped, thin and oval specimens, prevalent in Acheuléen stations, were more easily broken. The Moustérien flake is known to French archæologists as *le grand éclat Levallois*, from its abundance in the station of that name near Paris. During the Moustérien epoch its usefulness was so much appreciated that it almost entirely superseded the *coup-de-poing*, which so largely dominated the flint industry of the Chelléen and Acheuléen epochs. In opposition to the late G. de Mortillet, M. Rutot holds that the Levallois flakes are to be found in all deposits containing specimens of the *coup-de-poing* (*Congrès de Dinant, Session XVIII*, p. 150).

With regard to the geological age of the stratum in which the skull was found, Mr. Clement Reid writes (*loc. cit.*, p. 150) as follows :

"The deposits are not pre-Glacial or even early Pleistocene—they belong to an epoch long after the first cold period had passed away : but they occur at the very base of the great implement-bearing succession of Palæolithic deposits in the south-east of England."

One noteworthy feature of the Piltdown skull is that it has a broad and flattened appearance with a cephalic index of about 79, which makes it an exception to Palæolithic crania hitherto recorded. The only other instance, known to me, of a brachycephalic skull having been found in undoubted Magdalénien deposits is that of Placard (Charente), which had a cephalic index of 80. Curiously enough, like the Piltdown specimen, it was also that of a female. According to M. Hervé its high cephalic index was partly due to its sex, but in all other respects it possessed characteristic dolichocephalic characters. I wonder if pressure had anything to do with the flattening of the Piltdown cranium.

2. *Neanderthal-Spy race.*—We have already (Chap. II, p. 36) described the circumstances in which the Neanderthal skeleton was discovered, from which it will be seen that it was only the calvaria that was recovered; and consequently there is no evidence as regards its facial characters (see Fig. 4). One

of the Spy skulls (Fig. 11), had, however, the mandible associated with it, and we can therefore form a better opinion of its general characters. It shows a low, retreating forehead, prominent eyebrows, marked prognathism, no chin and large third molar teeth.

FIG. 11.—Side view of Spy skull (No. 1) ($\frac{1}{3}$). (*After Fraipont.*)

The Spy skeletons were discovered in 1886, buried 12½ feet in fallen débris at the entrance to a grotto in the province of Namur, Belgium. The worked flints found in the cave were of the Moustérien types, and among the fauna represented were *Rhinoceros tichorhinus*, cave-bear, mammoth, hyæna, etc. No works of art were among the relics, so that the Spy

troglodytes are justly regarded as belonging to an earlier period than that in which the reindeer-hunters and artists flourished.

The osteological characters of the Spy calvaria correspond in a remarkable degree with those of the Neanderthal specimen, as will be seen from the following tabular statement:

	Spy.	Neanderthal.
	mm.	mm.
Antero-posterior dia. (max.) .	200	209
Transverse do. . .	140	144
Frontal (min.)	104	106
Do. (max.)	114	122
Horizontal C reumference . .	580	590 (571 ?)
Cephalic index	70	72

Fossil bones, showing more or less the characteristics of the Neanderthal-Spy race, have been found in the Trou de la Naulette, near Dinant, the caves of Malarnaud (Ariège), Chapelle-aux-Saints (Corrèze), Moustier and Ferrassie (Dordogne), the rock-shelters of La Quina and Petit-Puymoyen (Charente), Krapina (Croatia), Gibraltar, etc. Of these, the three most instructive remains found in recent times are those of Le Moustier, Chapelle and La Quina. These have been respectively described by MM. Klaatsch, Boule and Martin. The first two were regarded as burials of the Moustérien Age, and their skulls show all the osseous peculiarities of the Neanderthal-Spy race (Figs. 12 and 13). In both the facial

bones were strongly prognathic, and the chin was undeveloped. M. Boule describes the man of Chapelle as having a bestial aspect, and places him, in point of cranial development, half-way between *Pithecanthropus erectus* and the lowest of present-day savages.

Fig. 12.—Side view of the skull of *Homo mousteriensis hauseri* (⅓). (*After M. Hauser.*)

The facts with regard to La Quina skeleton are so recent that it was only on the 27th of June of last year (1912) that Dr. Martin was able to lay the reconstructed skull and mandible before the members of the *Société Préhistorique Française* (Fig. 14). From the published details we see that there is a remark-

able parallelism between the skulls and jaws of La Quina, Spy (No. 1) and La Chapelle. Dr. Martin also shows by the superposition of profile diagrams of three calvaria (*La Quina*, *Pithecanthropus* and a modern Arab) the great gulf in cranial development which

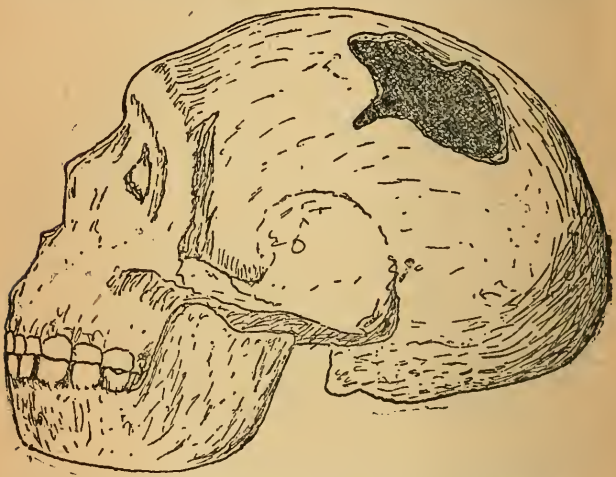


FIG. 13.—Side view of the skull from Chapelle-aux-Saints after being restored by M. Boule (⅓). (*From L'Anthropologie.*)

separates modern humanity from the Moustérien races of the Palæolithic period.

The physical characters of the race may be thus stated:

Cranium dolichocephalic (cephalic index 70–75); forehead low and retreating (platycephalic); superciliary ridges very prominent;

chin undeveloped, sloping backwards; alveolar prognathism strongly marked; stature small, about five feet; body massive, with short arms and bent legs.

3. *Magdalénien race.*—The next people of whom we have sufficient osteological data to

FIG. 14.—Side view of La Quina skull (⅓). (*After Dr. Henri Martin.*)

fix their chronological horizon are the reindeer-hunters of France, whose works of art have so greatly astonished the modern civilized world. They are represented by three skeletons found at the stations of Laugerie Basse, Chancelade and Duruthy. Their special characters are as follows: Crania well filled and dolicho-

cephalic (cephalic index 72–74); forehead full and lofty; superciliary ridges moderately prominent; chin well formed; orthognathic profile; stature small, 5 feet 2 inches to 5 feet 4 inches.

L'Homme écrasé of Laugerie Basse lay on a Magdalénien floor in the attitude of sleep underneath a fallen block which had crushed his spine. A number of shells from the Mediterranean were scattered about over the

FIG. 15.—Side views of the skulls of Chancelade (A), and Laugerie Basse (B). (Greatly reduced.)

body, which apparently had adorned the man's dress. There can be no doubt that this skeleton belonged to a man who was contemporary with the culture débris over which he reposed (Fig. 15B).

The Chancelade skeleton was found buried in a small rock-shelter beneath several layers of Magdalénien débris. The body was in a bent-up position, and around it were streaks of peroxide of iron, supposed to have been used for ritual purposes (Fig. 15A).

The Duruthy skeleton had also been crushed by fallen rocks, which damaged the skull so much that no precise measurements could be taken of it. It was, however, clearly dolichocephalic and in all respects similar to the skulls of Laugerie Basse and Chancelade. Near it was found a necklace composed of fifty canine teeth (three of lion and the rest of bear), most of them having been adorned by various devices—one having the figure of a seal, another that of a pike, and a third a form which looks like a glove for the forearm.

The Magdalénien people appear to have been the direct descendants of the Neanderthal-Spy race, and to have occupied not only the same geographical area, but a considerable extension of it, as shown by the number of stations discovered within regions formerly covered by glaciers. Their well-filled skulls are an indication of the intellectual advancement that had taken place since their nomadic forefathers entered Europe.

4. *The Cro-Magnon race.*—The physical characters of this race have been derived from one specimen, viz. that known as the "Old Man" of Cro-Magnon, which was found, along with portions of four other human skeletons (supposed to be one family), on the surface of the débris at the back part of the Cro-Magnon cave. The characters are as follows:

Cranium highly developed (cephalic index 73–76); forehead large, lofty and well-shaped; superciliary ridges fairly prominent;

face short but broad; chin well formed; orthognathic profile; stature tall, over 5 feet 10 inches in height.

The Cro-Magnon skull (Fig. 16), has, in point of osseous development, some resemblance to those of the Magdalénien race, and hence it is

FIG. 16.—Side view of the skull of the "Old Man" of Cro-Magnon (⅓). (*From Reliquiæ Aquitanicæ.*)

sometimes classified as belonging to the latter. But the great size of all the Cro-Magnon skeletons is sufficient to place them in a category by themselves. The geographical distribution of the race, so far as at present known beyond the rock-shelter of Cro-Magnon, is almost confined to the caves of Grimaldi.

Here, out of about a dozen skeletons sufficiently well preserved to have their osteological characters determined, all have been recorded as belonging to the Cro-Magnon type, with the exception of two which M. Verneau describes as a new race. All the skeletons of the Cro-Magnon type found in the Grimaldi caves were ceremonial interments by inhumation, except one body which had been carbonized; but as ornaments precisely similar to those found with the inhumed bodies were associated with the carbonized bones, there can be little doubt that the latter also belonged to the Cro-Magnon race. The bodies at the time of burial appear to have been covered over with a layer of the red oxide of iron, instances of which have been recorded from other widely separated localities, such as the interment known as the Paviland red woman in the Gower Peninsula, and others at Chancelade, Mas-d'Azil, Brünn (Moravia), etc.

5. *Race de Grimaldi.*—Of this race two skeletons have been found in the "Grotte des Enfants," near Mentone, one being that of a young man and the other that of an aged female. They lay close to each other and evidently belonged to the same race, with a type of skull which Dr. Verneau describes as negroid, and disclosing anatomical characters intermediate between those of the Neanderthal and Cro-Magnon skeletons (Fig. 17). Their physical characters may be thus stated:

Cranium elliptic, cephalic index (male)

69·72 and (female) 68·58; forehead fairly well developed; face strongly prognathic; chin slightly receding; stature small, 5 feet to 5 feet 2 inches in height.

The position of these negroid skeletons in the cave was nearly 2½ feet lower than that

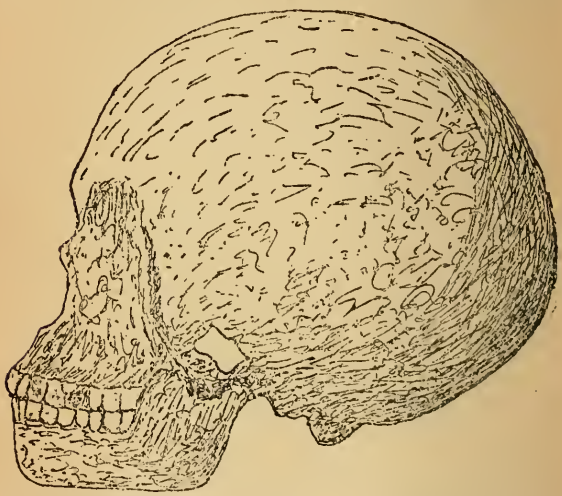


FIG. 17.—Side view of the skull of the negroid youth from the *Grotte des Enfants* (⅓). (*After Verneau.*)

of another skeleton which measured 6 feet 3½ inches from head to foot. This veritable giant has been described by Dr. Verneau as belonging to the Cro-Magnon race—thus proving the existence of two very different races in the same locality, and almost on the same chronological horizon.

6. *Homo heidelbergensis.*—Professor Schoetensack of Heidelberg has lately described a human mandible found at a depth of twenty-four metres from the surface, in ancient fluviatile deposits of the river Neckar, situated at a place called Mauer, ten kilometres south-east of the town of Heidelberg. Along with it, in the same bed, bones of the following animals were found:

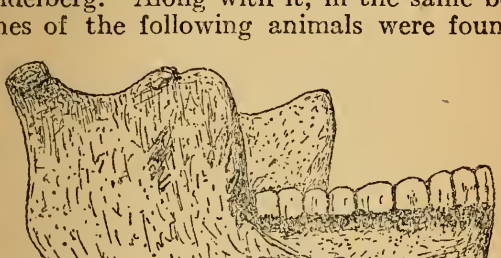


FIG. 18.—View of the human mandible of Heidelberg (about ½). (*After Schoetensack.*)

stag, elk (*Alces latifrons*), cave-lion, horse (*Equus stenonis?*), *Rhinoceros etruscus*, and *Elephas antiquus.* The bones of the last named were very abundant, and among them (quite close to a mandible) lay the human jaw. Shells similar to those of the Cromer forest beds were also found in the same deposits.

The Heidelberg mandible is the only bone of this skeleton known, and, in some respects, it is the most simian-like hitherto come to

light, especially as regards the enormous size of the ascending ramus, which is nearly double that of a modern man (Fig. 18). The absence of the chin is also a prominent feature. As regards the arrangement and relative size of the teeth, this jaw seems to come nearer modern specimens than most of those hitherto recorded as Palæolithic. Some palæontologists profess to see a parallelism between it and that of Australian savages.

Culture and Civilization

In the absence of positive chronology, every student of the pre-history of man will recognize the necessity of having some convenient method of tabulating the recorded phenomena in their order of succession, as geologists have so successfully done by collating fossils, and other organic remains, with the superposition of strata. In prehistoric archæology various methods have been suggested, of which the following may be noted as applicable to the Palæolithic period :

In 1869 Gabriel de Mortillet conceived the happy idea of classifying the industrial remains of the Palæolithic people in chronological sequence, according to the degree of culture disclosed by the relics found on certain stations which he regarded as typical. His mode of classification (with the recent addition of *Aurignacien*) is the most practical that has hitherto been suggested, and is therefore adopted in this work. According

to this system the whole range of Palæolithic civilization is divided into six epochs, viz. *Chelléen*, *Acheuléen*, *Moustérien*, *Aurignacien*, *Solutréen* and *Magdalénien*. All these so-called epochs are but mere landmarks on the high-road of advancing civilization, and are intended to represent, as nearly as possible, the successive phases of Palæolithic culture. Some kind of nomenclature is absolutely necessary, as otherwise it would be impossible to fix attention on any particular fact in the progressive stream of civilization, without having recourse to more or less descriptive details. It is therefore essential to have precise ideas associated with these *milestones* by the way, so that by the mention of a single name we at once know in what part of the road we are travelling. The attainment of this object will be best accomplished by a brief description of the typical stations on which the nomenclature is founded, and of a few of their most characteristic relics.

1. *Chelléen.*—So named from the station of Chelles, a small plateau of alluvial deposits, eight miles east of Paris and eight metres above the bed of the Marne, from which it is distant two kilometres. A section shows three separate layers, within a thickness of eight metres, resting on Tertiary deposits. The lowest layer is especially interesting, on account of the number of teeth of *Elephas antiquus* and *meridionalis* which it has yielded, associated with remains of *Hippopotamus major*, *Rhinoceros merckii*, *Trogontherium*,

cave-bear and cave-hyæna, together with flint implements almost exclusively of the *coup-de-poing* type. These animals were survivals from the Pliocene Age, and the presence of their bones in any locality indicates a warm climate. The middle portion of the deposits was cemented by calcareous infiltrations, and according to G. de Mortillet both it and the upper sandy gravels were later formations, and contained only bones of the mammoth, together with those of the northern fauna and stone implements of Moustérien types.

2. *Acheuléen.*—The flint implements found at Saint Acheul, at Amiens, in the valley of the Somme, from which the Acheuléen epoch derives its name, are not very different from those of Chelles. The former have a greater variety of forms, and the *coup-de-poing* becomes sensibly thinner, smaller, and more delicately chipped at the edges. The more pointed of the Chelléen forms are known to the workmen as "ficrons," while the almond-shaped specimens, called "limandes," are characteristic of Saint Acheul. Moreover, the two earlier elephants and the *Rhincceros merckii* have been found in the alluvial beds at Abbeville. Human bones, with perhaps the exception of the Piltdown skull and mandible, have not been found in these river gravels sufficiently well preserved to inspire confidence in drawing precise racial conclusions from them; but the flint implements are valid proof that man lived at that time in

Central Europe as far west as England, and some parts of the Spanish peninsula. The *coup-de-poing*, which was the chief weapon or implement used by him, has been found not only along his highways and by-ways in European countries, but in Algeria, Egypt, Sahara, Congo, the Cape, Palestine, Persia and India.

3. *Moustérien.*—This term is derived from the well-known cave of Le Moustier, situated on the right bank of the Vézère, and about ninety feet above it. It was examined by Lartet and Christy in 1863, and subsequently by De Vibraye, Messénat, and others. Besides the deposits in the interior of the cave, there was an outside plateau in which a human skeleton of the Neanderthal-Spy type has been recently found (Fig. 12), see p. 181. During its habitation by man the climate appears to have been cold and damp, and among the contemporary fauna were the mammoth, woolly-haired rhinoceros, cave-bear, and musk-ox. The two earlier elephants, hippopotamus and *Rhinoceros merckii* were not represented—thus indicating a cold climate.

The special features of the industrial remains found in Le Moustier were the scarcity of the *coup-de-poing*, and the splitting up of flints into smaller implements, such as scrapers and large flakes, mostly trimmed on one side only—the *éclat Levallois* of French writers. This multiplication of small implements was due to the fact that man, owing

to the coldness of the climate, was obliged to seek shelter in caves, or improvised huts, and to clothe himself with skins, the preparation of which entailed the use of special tools and instruments. On the whole, the remains of man's handicraft works disclose an advance on those of the Drift-men; but there was a sufficient sprinkling of the *coup-de-poing* types to show that both people were of the same race.

4. *Aurignacien.*—Prior to 1852 the small grotto of Aurignac (Haute-Garonne) was concealed by a talus, and only then incidentally discovered by a workman in pursuit of a rabbit. The entrance was closed by a stone slab, and inside were the remains of seventeen human skeletons, which, on the discovery becoming known, were, by order of the mayor of the town, removed and reburied in the parish cemetery. Outside the flagstone which closed the entrance to the cave were found, along with ashes and a hearth made of flat stones, a finger-marked circular hammer-stone used for chipping flints, and "a great variety of bones and implements; amongst the latter not fewer than 100 flint articles—knives, projectiles, sling-stones and chips, and among them one of those silicious cores, or nuclei, with numerous facets, from which flakes or knives had been struck off. . . . Among the bone instruments were arrows without barbs and other tools made of reindeer horn, and a bodkin formed out of the more compact horn of a roe-deer." (*Antiquity of Man*, p. 184.)

One of the bone objects, pointed at one end and having a broad split base, is regarded as giving the station its special character. Scattered through the earth were the broken bones of extinct animals, among which were the following: hyæna, cave-bear, cave-lion, woolly rhinoceros, reindeer, Irish elk and mammoth.

Besides the characteristic Aurignac bone point, split at the base for attachment to a shaft, there were various objects of bone, or horn, in the form of pins, pointers and chisel-like instruments with transverse scratchings (*marques de chasse*), which, according to Breuil, are characteristic of the stations of this epoch. Great progress was also made in the art of working in flint, as shown by the number of new and extremely varied forms of flint implements, often of small size, which were then in use.

5. *Solutréen.*—The station of Solutré (Saône-et-Loire) was an open-air encampment, having a fine exposure to the south, and sheltered on the north by a steep ridge. The climate was mild and dry, the glaciers were already on the retreat, and the rivers less torrential. The remains of the settlement, covering an area of some 10,000 square metres, are situated just beyond the limits of the cultivated land, and within a short distance of a spring of excellent water.

The special features of the Solutréen stage of culture are well defined. First of all comes a marked advance in the manufacture of flint

implements, as disclosed by the beautiful workmanship on the so-called laurel and willow-leaf lance-heads, which show flaking almost as fine and delicate as that on the sacrificial knives of Egypt. The fine chipping on these weapons could not be produced by the ordinary method of hammering, so that the artists of the period had already experience in doing this work by pressure. An equally characteristic object is the willow-leaf point (*pointe à cran*), which has one side of the stem, or hilt, cut away, leaving a tang-like appendage.

Another distinguishing feature of this station was the predilection of its inhabitants for horse-flesh, as shown by the extraordinary quantity of the bones of this animal found among the débris. Although the reindeer was largely represented it was not, in point of numbers, anything like the horse—a peculiarity which was reversed in the succeeding Magdalénien epoch.

Sculpture on stone was practised, as shown by the finding of four quadrupeds carved out of limestone pebbles. The art of engraving on bone was also known but, apparently, little practised. From the lumps of pigment and ochre occasionally met with on the hearths, it is supposed that painting was carried on to some extent. Bone needles with perforated eyes were for the first time found in the upper strata.

6. *Magdalénien.*—The rock-shelter of La Madeleine, which gives name to the Mag-

dalénien epoch, was situated on the right bank of the Vézère, at the base of a limestone escarpment with an almost vertical face, about five metres from the river and only six metres above its level. It was completely excavated by Messrs. Lartet and Christy, and the principal relics found are figured in *Reliquiæ Aquitanicæ*. The most characteristic animal was the reindeer, which shows that the climate had still a sub-Arctic character. The mammoth, though abundant at the commencement of the epoch, was gradually becoming scarce, and towards its close the extinction of the last of the Palæolithic elephants was a *fait accompli* in Central Europe.

The Magdalénien people started life, as it were, with a working knowledge of the discoveries and mechanical inventions of their predecessors; and hence their arts, industries, accomplishments, etc., represent the final outcome of Palæolithic culture and civilization. In the débris of their stations are to be found the perfected results of the application of mechanical principles to the improvement of the tools and implements requisite for the accomplishment of their daily avocations. Their principal occupation was the chase, the produce of which constituted their staple food; and to capture the big game of the neighbourhood in sufficient quantity entailed the use of a variety of new and improved weapons. One characteristic feature of the age was the practical knowledge that bone, ivory and reindeer-horn were better materials

for the manufacture of piercing implements than flint. Hence, the rapid disappearance of the laurel-leaf blades, which gave place to a series of improved weapons made of bone and horn—daggers, long cylindrical lance-heads, barbed harpoons, and quite a number of small dart-points to be affixed to light wooden shafts. The new lance-heads thus requisitioned consisted of flat or conical rods, pointed at the distal end, and adapted at the other for attachment to the shaft by several mechanical processes. Sometimes the proximal end had a wedge-shaped slit into which the shaft penetrated—an enlarged example of the typical Aurignacien point. This process was sometimes reversed by making the slit in the shaft. In other cases the attached end of the lance-head terminated in a slanting splay, so as to be spliced with a corresponding one in the shaft. Others had the proximal end terminating in a blunt cone, so as to form a loose joint—in which case the blunt end of the head had either a circular ridge, or two projecting lobes, or a small perforation placed a little above the cone, which served for the attachment of a string when the head of the spear was intended to remain in the animal's body. When spearing salmon the string was attached to a float which indicated the position of the wounded fish. These arrangements were, perhaps, more applicable to the barbed harpoons, of which so many beautiful specimens were found by Lartet and Christy on the Magdalénien stations

of the Dordogne. Some of these weapons are so small as to be sometimes described as arrow-points; but there is no evidence to show that the bow was known to the Palæolithic people.

Both spears and harpoons were thrown by the hand, but this action was sometimes assisted by an apparatus called by French writers *propulseur*, or spear-thrower, which consisted of a stick made from the beam of a reindeer-horn, with a notch at one end in which the butt end of the lance rested. In discharging the weapon the operator manipulated with his fingers in such a way as to give a greater impulse and a better direction to the lance than if he merely threw it with the hand. That mysterious but often highly ornamented object, the so-called *bâton de commandement*, though known as early as the Solutréen Age, was only now met with in sufficient numbers to be regarded as an object of utility. With regard to the multiplicity of manufactured objects requisite for the management of domestic affairs, the people had now learned to make a better selection of the raw material for special purposes. For this reason needles were always made from a portion of the surface of a long bone, the cannon-bone of a horse's leg being generally preferred for this purpose, on account of its hardness. Long slender pieces were cut out of the bone by sharp flint implements. The eye was made by scraping a small hollow near one end, and a similar

one on the other side just opposite the former, and worked till the two met. The perforation thus effected had the characteristic of being narrow in the middle and opening out into a conical expansion on both sides. Hence a needle offered for sale having a bored hole would be at once recognized as a forgery. Ivory was equally good for the making of a needle, but latterly this was becoming a scarce commodity. Spears and harpoons were made of reindeer-horn because of its solid consistency—long bones being unsuitable on account of being hollow in the centre. Only the smaller lance-heads were made of bone.

The art of engraving on plaques of bone, ivory and stone now became so common that there was hardly a manufactured tool but was adorned with figures of the contemporary fauna, especially the animals hunted for food—horse, reindeer, aurochs, goat, mammoth, etc. Into this category comes the famous relic in the form of a piece of ivory from the outside layer of the tusk, having incised on it the outline of a hairy elephant.

The domain of art, sculpture, engraving and painting assumed a wider range, embracing not only the small plaques with miniature figures, but the decoration of the walls of inhabited caves with sculptured friezes and life-size paintings of animals.

In domestic economy there is evidence that the kitchen *ménage* was well looked after. They roasted the flesh of the captured animals and utilized their skins as garments.

Possibly some round pebbles, abundantly met with in the débris around the hearths, might have been used as "pot-boilers." A few stone mortars and pestles which occasionally turned up would appear to have been used only for mixing colouring matter to paint either their bodies or the walls of the caverns they frequented. Two small flasks or tubes made out of the cannon-bones of reindeer, which contained traces of ochre, are supposed to have been an artist's paint-box. Tailoring was extensively practised, and the needles, pins, buttons, etc., as well as the small flint implements used for such fine work, were abundantly met with. Their ornaments consisted of perforated teeth, shells and pendants, made of various materials.

The caverns adorned with wall pictures in the form of engravings, sculptures and paintings in various colours number about thirty, nearly all of which are situated in the south-west of France, the Pyrenees, and the north of Spain. They all belong to one phase of art which appears to have been practised for a long time. Although there are indications that the dawn of painting dates as far back as the Aurignacien Age, there can be no doubt that polychrome painting was the last phase in the evolution of Palæolithic art. M. Breuil has shown that in caverns with pictures of long standing a chronological sequence in the progressive stages of art can be established, by observing the superposition of one figure above another. But however this may be,

it is now generally admitted that ultimately engraving on cavern walls became subservient to painting in colours and free-hand drawing.

Among the fauna depicted on the walls of Altamira and Marsoulas neither the reindeer nor any of the extinct animals are to be found. Though distant from the principal centre of the painted caverns of Perigord, they are regarded by MM. Cartailhac and Breuil as having passed through the same phases of evolutionary art. The usual animals in these caves are bison, horse, goat and stag. Besides animal forms, there are groups of enigmatical signs, graffiti and a sort of pictographic arrangement of coloured dots and lines, structures of a tectiform character supposed to represent wooden enclosures, etc. Man is also represented by about a dozen incomplete designs, badly drawn, grotesque in character, and altogether inferior in execution to the animal figures. But this peculiarity need not cause surprise, as it is a feature of Palæolithic art, in general; for no human representation hitherto known of this kind, whether engraved or painted, goes beyond the artistic efforts of children.

An exception, however, may be made to this sweeping generalization in deference to the opinion of the late M. Piette, who entertained the theory that Palæolithic man first acquired the art of sculpturing animals, and that, after practising high and low relief, he learned ultimately to draw incised figures on the flat. This theory was based on the discovery

of a few small human figurines, sculptured in ivory, showing great artistic merits, under stratigraphical conditions, which he regarded as pre-Solutréen, and in which no drawings were found—the latter having appeared only in later strata.

Perhaps the most novel discovery was that in the cave of Niaux (Ariège) animal figures, similar in design to those on the walls, had been traced on the now hardened mud of the floor. Such figures were observed in several places in the inner recesses of the cave, especially under low overhanging rocks where visitors could not walk; and, singular to relate, they remained as clear and distinct as if they had been recently executed. Among them the following animals are represented, viz. bison, ox, horse, trout, and man, but of the last only a footprint—surely one of the most marvellous of footprints on "the sands of time."

The system of human economy founded in these early days was the outcome of the free play of natural laws little affected by the principles of religion or ethics. The reflections of these Palæolithic folk had probably for the most part to do with the habits of the animals they hunted, and the strategic means by which they could be waylaid and captured. Of agriculture, the rearing of domestic animals, the arts of spinning and weaving, and the manufacture of pottery they appear to have been absolutely ignorant. But yet, in an environment of such primitive resources and

limited culture associations, these wild hunters developed a genuine taste for art, and cultivated its principles so effectually that they have bequeathed to us an art gallery of some four or five hundred specimens of engravings, sculptures, and even paintings in colour, many of them being so true to their models that they bear a favourable comparison with analogous works of the present day.

CHAPTER V

THE TRANSITION FROM PALÆOLITHIC TO NEOLITHIC CIVILIZATION—THE HIATUS PROBLEM AND LAND SUBMERGENCE

In the last chapter we had a passing glimpse of the Palæolithic races of Western Europe—their physical attributes, social industries and artistic attainments—as disclosed by their tools, weapons, ornaments and works of art. In moving down the stream of time, still keeping as far as possible within the same geographical area, we find the land inhabited by other races whose social organizations and general methods of living appear to have been totally different from those of the former. Here we pause for a little, in order to take a preliminary glance at the characteristic features and landmarks of their civilization. The stage in European history we are thus called upon to inspect is known by the name

Neolithic Age, so-called because a new and improved mechanical principle then came into general use, viz. the art of polishing stone implements by rubbing them with some hard material, so as to give them a sharper cutting edge than was possible by the old process of chipping. How far we have travelled in time to reach this phase of culture we cannot say in so many years, or centuries, or even millenniums.

In our survey of the geography of Western Europe during the Palæolithic period, Britain was part of the European continent whose westward sea-board extended far into the Atlantic Ocean. The beds of the larger portion of the German Ocean, the English Channel and the Irish Sea were raised above the level of the Atlantic and formed the happy hunting-ground of our early forefathers. But from the earliest dawn of Neolithic times nearly the whole of these extensive plains and river valleys were transformed into great inland seas. Nothing was to be seen of their former condition but the roots of a few submerged forests cropping up here and there, at low-water mark. The last of the extinct mammals had already died out or disappeared from the British area, with the exception of a few stray specimens of the Irish elk, the reindeer and the wild bull (*Bos primigenius*), which lingered in a few isolated localities down to proto-historic times. In short, the fauna and flora characteristic of sub-Arctic regions had given place to those of a temperate climate.

But the most astounding change in regard to animal life was the domestication of a number of animals (dog, ox, horse, pig, sheep and goat), some of which were reared as pets, others for food, and others for their milk. Another innovation of far-reaching consequence to humanity appeared to have been practised at a very early date, viz. the cultivation of a number of cereals (wheat, barley and millet), fruits and a few plants. In addition to such changes in the physical environment, these Neolithic folk were in possession of equally novel methods in their domestic economy. They were skilled in the ceramic art, and in the manufacture of cloth by spinning and weaving wool and fibrous textures. In hunting the forest fauna they used, in addition to spears, lances and daggers, the bow and arrow. They built houses both for the dead and the living—thus showing that religion had become a governing principle in their social economy. But of the artistic taste of their Palæolithic predecessors they possessed not a vestige, and whatever they did by way of ornament consisted of a few incised scratches arranged in simple geometrical patterns.

It is quite evident that such radical changes, embracing nearly all departments of social life, were not adopted *en bloc*, nor in a short space of time. Alterations in the relative level of sea and land, on so large a scale as the submergence of half a continent, are generally the result of slow cosmical processes.

The same may be said of climate, floras and faunas. The inventive skill that leads to mechanical improvements in social industries, and the rise of pastoral and agricultural occupations, are essentially the outcome of long experience under the unprogressive influences inherent in mankind. In fact, the fundamental principles of the two civilizations are so divergent that the Neolithic can hardly be regarded as a local development of that of the Palæolithic period. It was the striking difference between the practical elements of the two civilizations that gave rise to the theory that after the close of the Palæolithic period there was a break, or *hiatus*, in the continuity of human existence in Western Europe. Hence arose an animated controversy which divided archæologists into two opposing camps—one contending that the Quaternary population followed the retreating ice and its associated fauna northwards, leaving behind them a desert land; the other maintaining that they became amalgamated with new races from Eastern lands, and that their blood still permeates the veins of the modern inhabitants of Europe. In earlier days the former doctrine was advocated by some of the foremost authorities, such as Ed. Lartet, G. de Mortillet and others, but it is now largely discarded. On the other hand, Paul Broca and a few other distinguished archæologists maintained from the very outset that the flint tools of the later Palæolithic stations and those of Neolithic times were not so dissimilar as to

justify the idea that there had been any break in the continuity of the flint industry in Europe. And further, that there was valid evidence to show that the extremely dolichocephalic skulls found in the sepulchral caverns of the Lozère (Baumes-Chaudes, L'Homme-Mort, etc.), were those of the descendants of the cavemen.

At the meeting of the Congress of Anthropology and Prehistoric Archæology held at Stockholm in 1874, M. Cazalis de Fondouce reviewed the *Hiatus* theory in all its aspects, in a masterly paper, in which he combated it on every point. His general conclusions were that the transition from the one civilization to the other was slow, but without interruption since the commencement of the Palæolithic period down to the present day; that towards the close of that period two or more different races had combined and developed the primary elements of Neolithic civilization; that the ameliorated climate attracted, from time to time, new immigrants who imported improved elements into the arts and industries; and lastly, that the incoming tribes gradually absorbed the indigenous people of the old Stone Age, thus accounting for the persistence of the marked ethnic peculiarities of the Palæolithic races still to be traced in the populations of Europe.

If the opinion of M. de Fondouce with regard to the ultimate fate of the Palæolithic folk be correct, as I believe it is, there must have been a transition period of considerable

duration, during which the characteristic features of the full-blown Neolithic culture can be shown to have been acquired by slow degrees. 'Stations, such as caves and rock-shelters, shell-heaps, huts, camps and various sedimentary deposits, yielding relics which prove continuous habitation from Palæolithic to Neolithic times, have been discovered within recent years in many localities throughout Central and Western Europe.

A rambling discussion over such a wide field of research as the transition period is manifestly beyond the limits of this book, but the subject is too important to be altogether ignored. The best way of bringing the gist of the subject before readers is to give a brief account of the arguments derived from one or two characteristic sites.

The late Edward Piette was one of the most strenuous advocates of the existence of a transition period, evidence of which he had obtained in several caves and rock-shelters situated among the rocky regions to the north of the Pyrenees, the most important of which is the cavern of Mas-d'Azil (Ariège). This is a vast subterranean gallery, about 400 metres in length, at the bottom of which foams the turbulent waters of the Arise. During the construction of a road along the stream the relic-bearing deposits, on which M. Piette founds his arguments, were discovered. A *résumé* of his researches on this site was brought before the Congress of Anthropology and Prehistoric Archæology held in Paris in 1889,

with the result that there was a consensus of opinion among the members that his discoveries proved that the interval between the two civilizations, in that locality, had been of short duration. The precise data are as follows :

Above a stratum containing relics characteristic of the Reindeer Age, but beneath deposits with relics equally characteristic of the Neolithic period, Piette describes two beds, the combined depth of which amounted to four feet, which yielded the relics supposed to indicate a transition period. The lower of these two beds was composed chiefly of ashes and wood-charcoal intermingled with some fallen rocks. The thickness of this bed was 25½ inches, and among its contents the following worked objects were found : flint knives and scrapers, a number of perforated deer teeth, arranged as if they had formed a necklet, also perforated teeth of various other animals; pins, polished pointers, and spatulæ of bone; barbed harpoons made of stag-horn, some being perforated at the butt-end with an oval or round hole, and others with barbs on one side only; also a large number of pebbles of quartz or schist—such as could be picked from the bed of the river—some "round-nosed" and pestle-shaped, showing usage markings at one end, and others, flat and oblong, having various devices painted on them with peroxide of iron (Fig. 19). The fauna was represented by bones of the stag, roebuck, chamois, ox, horse, com-

mon bear, wild-boar, badger, wolf, beaver, rat, and some birds and fishes. Grains of wheat and a variety of fruit-stones and seeds were also identified. The larger bones of two human skeletons, which appeared to have

FIG. 19.—MAS-D'AZIL. Harpoons of stag-horn (1, 2, 3); objects of bone (7, 8, 9, 10); round-nosed pebble worked at one end (4); flint object (6); horn worked at one end(5); tooth of a bear (11). (All ½). (*After Piette.*)

been buried after the flesh had been removed, had also been marked with red patches of peroxide of iron. Super-imposed on this bed, but passing into it almost insensibly, were deposits of wood ashes 23½ inches thick, streaked with bands of grey, white and red,

in which were embedded quantities of land shells (*Helix nemoralis*), evidently the remains of repasts. These shell-heaps were intercalated between the layers of ashes, and extended over several yards, with a maximum depth of about one foot. In this bed were also found harpoons and other relics similar to those in the bed of coloured pebbles; but in addition to these there were portions of small chisel-like implements of stone with sloping and abraded ends (Fig. 19, No. 6), but no regular stone axes. Only in the superincumbent layers were the latter found, where, still higher up, came objects of bronze and iron.

According to M. Piette there were changes in the external environment which could be correlated with these successive deposits of human occupancy. As the Reindeer period passed away, the climate became ameliorated but humid, as inferred from the presence of fruit-trees and the cultivation of grain. The people appeared to have lost their artistic taste for carving on bones, as they now manufactured harpoons of red-deer horn without a trace of ornament. They also painted selected pebbles with quaint devices of lines and round spots, and practised some obscure sepulchral rites in which the spreading of ochre on the desiccated bones seemed to play a part.

But the chief interest in the discoveries at Mas-d'Azil lies in the harpoons of red-deer horn, the real significance of which had then

for the first time been recognized, although a few specimens had already been found in other stations. Since attention has been directed to them they have been discovered in considerable numbers in various and widely separated localities, and are regarded as typical relics of the transition period.

Among other cave-dwellings which have yielded flat harpoons made of red-deer horn one of the most interesting is the *Grotte de Reilhac* (Lot), described by MM. Cartailhac and Boule in 1889. On Fig. 20 are shown four worked objects from this station, viz. portion of a harpoon typical of the Magdalénien epoch (4), two harpoons of the Azilian type (5, 6), and a deer-horn holder for a stone axe so commonly met with among lake-dwelling relics (7). The presence of these relics, so characteristic of the successive cultural stages, conclusively proves that the *Grotte de Reilhac* was inhabited from the Reindeer period down to Neolithic times.

In face of these and other rapidly accumulating facts, proving the existence of deposits of human débris containing relics stratigraphically proved to be later than those of the Reindeer period, but older than those of the polished stone age, Mortillet abandoned the *Hiatus* theory and filled up the gap by adding a new epoch to his previous classification, which he called *Tourassien*, after the Grotte de la Tourasse (Haute-Garonne). This station yielded, along with a few other bone relics of intermediary forms, no less

than a dozen harpoons of the kind now under review. Here the reindeer was almost entirely supplanted by the red-deer, as it contained

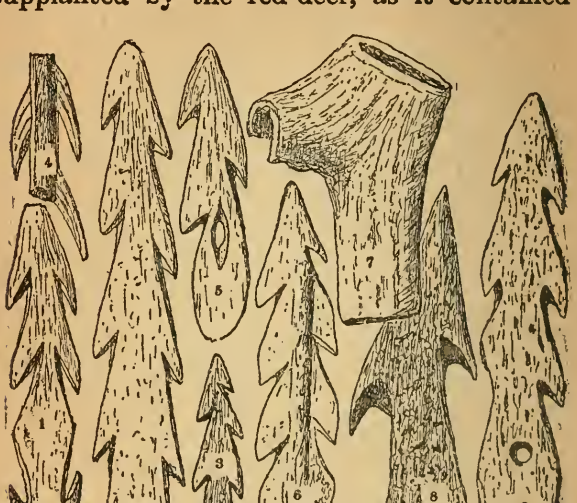


FIG. 20.—Harpoons, etc., from various localities. No. 1. Victoria Cave; (2) the bed of the Dee (Kirkcudbright); (3) near Newcastle; (4–7) *Grotte de Reilhac* (France); (8) Swiss Lake-dwelling (Collection Gross); (9) Laugerie Basse. (All $\frac{1}{2}$, except 4 and 7 = $\frac{3}{8}$.)

only two teeth of the former, whereas those of the latter amounted to 500. The deposits in which they were found lay beneath a series of Neolithic burials.

It may be observed that the flatness which is characteristic of these harpoons is due to the fact that the texture of red-deer horn is spongy in the interior, and consequently it is only the outside of the horn that can be used in their manufacture. On the other hand, the harpoons of the Palæolithic period have round stems and conical butts, with two projecting knobs close to the butt-end for keeping the string from falling away when the harpoon becomes detached from the handle.

Similar evidence is derived from a study of the post-glacial deposits of the rock-shelter of the Schweizersbild, which have yielded to Dr. Nüesch not only relics of the hunters who frequented this shelter, but remains of the animals on which they feasted, in sufficient abundance to enable experts to make out a complete list of the ordinary fauna of the period. It has been shown that, during the occupancy of this rock-shelter by man, there had been a gradual transition from an Arctic to a temperate climate. The contents of these deposits indicate that the locality had been a constant rendezvous for bands of roving hunters from the Palæolithic period down to the Bronze Age.

Among inhabited sites which fall into the category of transition stations are the famous Kjøkkenmøddings of Denmark, and the recently discovered lacustrine settlement in the peat-bog of Maglemose (formerly the bed of a lake) in the island of Zeeland. The industrial remains on both these stations

consist of objects made of flint and horn, but no polished ones (Fig. 21). Among the flint implements there is one of a special type which is regarded as characteristic of the period, viz. the *tranchet* (No. 1), a kind of hatchet having the cutting edge on one side formed by a large facet. No. 3 is a fragment of an Azilian harpoon, and Nos. 4 and 5 are bone combs.

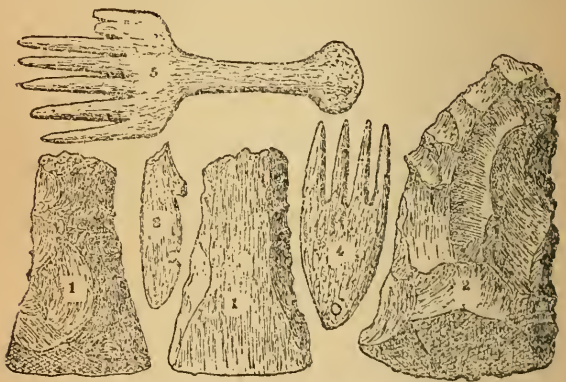


FIG. 21.—Objects from Danish *Kjøkkenmøddings* (1, 3–5), and Hut-dwelling of Campigny (2). (All ½.)

Except the dog, none of the ordinary domestic animals has been found on these stations, nor any of the cultivated cereals.

The *tranchet* is also the most characteristic implement in the hut settlement of Campigny (Seine-Inférieure) (No. 2). A workshop for the manufacture of this implement has been described at Coudraie, near Montevilliers (Seine-Inférieure). According to M. Salmon (*Dict.*

des Sc. Anth., p. 807) the *tranchet* is to be found in great numbers in the plateau stations of the departments of the Aube, Calvados, Nièvre, Oise, Saône-et-Loire, Yonne and others. The industrial remains of these stations scarcely advanced to the degree of using the polished stone axes, which are sparingly met with.

Of the less known of the early haunts of man during the transition period, one of the most instructive is a series of shell-mounds, discovered in 1863, in the valley of the Tagus, near the villages of Salvaterra and Mugem. The mounds are grouped on the left bank of the Tagus at from twenty-five to thirty metres above sea-level, and distant some thirty miles from the maritime shores of the present embouchure of the river. The shells are of marine origin, and when they were gathered and used as food, it is supposed that the sea extended up the valley as far as the shell-mounds which suggests that the land must have since risen considerably. The industrial remains disclosed by excavations are of a very rude character, consisting of primitive implements made of flint, quartzite, bone and horn. Among the flints are a few knife flakes, and some small cutting implements of rhomboidal forms. There are also some large flat stones, used for grinding purposes, together with the small hand rubbers. Horn and bone were utilized as chisels, pointers, spatulæ, etc. No polished axes, nor pottery, nor any indications of domestic animals have been found in these Portuguese settlements.

The most interesting feature of the investigations was the discovery of upwards of a hundred interments at various depths in the shell-mounds; but it does not appear that any grave-goods had been associated with the bodies. The osseous remains were much decayed and the skulls distorted, probably by the pressure of the débris. Enough, however, remained to show that they represented two races—one dolichocephalic and the other brachycephalic. Of the latter only two specimens were in the series (the cephalic index of one being 86–90), while all the others were dolichocephalic, with cephalic indices of 71·11 to 75·56. A reasonable inference from these archæological data is that the constructors of the shell-mounds were a mixed community, the great majority of which belonged to the old Palæolithic people of Europe; while the minority formed part of the advanced immigrants of the Neolithic races into Europe.

Turning now to Britain, we shall see there is also within its borders similar evidence of a transition period during which it was inhabited by a primitive population who may have been descendants of its original Palæolithic people.

The MacArthur cave was discovered in 1894 by quarrymen while removing stones for building purposes from a cliff facing the bay of Oban, and long regarded as marking the line of an old sea-beach. The contents of the cave consisted (1) of a superficial layer of black earth in which human remains were

found, including two dolichocephalic skulls, thus indicating that the final purpose of the cave was a burial-place; and (2) a food refuse-heap comprised of shells of various kinds and the remains of animals, partly superimposed on, and partly intercalated with, sea gravel. It would appear that during a storm, subsequent to the time when the cave had become a place of resort to man, the waves were forced into the cave, carrying with them a certain amount of shingle, which, after the abatement of the storm, had become the habitable floor of the cave, and over which the cave-dwellers again took up their abode.

If this deduction be correct, the importance of the Oban discovery cannot be over-rated, as it proves that man was an inhabitant of the district when the entrance to the cave was on the sea-beach, and sufficiently near the water to permit of the waves to enter it during a storm. The beach of to-day is, however, a hundred yards distant, and the lower shell-bed lay fully thirty feet above present high-water mark; so that a change in the relative level of sea and land must have taken place in that part of Scotland to the extent of some twenty-five or thirty feet, since the troglodyte hunters of Oban feasted on the marine and land animals of the district. These it may be observed were unquestionably Neolithic in character.

All the implements recovered from the débris in the cave were made of bone or deer-horn, with the exception of three hammer-

stones and twenty flints, mostly flakes and chips. The bone and horn implements were as follows : three pins, three borers, and a few bone implements of a nondescript character, being merely pointed or flattened at one end;

FIG. 22.—Skull and Relics from the MacArthur Cave, Oban. (All $\frac{1}{4}$, except 6, 8 and 9 = $\frac{3}{8}$, and skull greatly reduced.)

one hundred and forty "round-nosed," chisel-ended implements, having an extraordinary likeness to each other; and seven harpoons (two being entire) made of deer-horn (Fig. 22). The larger of the entire harpoons is six inches long, has four barbs on each side, and an oval perforation at the butt-end. The other differs

from the former only in being smaller and having no perforation. A mere glance at these bone implements, especially the harpoons, shows their striking similarity to those from Mas-d'Azil and other Azilian stations on the Continent. No archæologist can fail to be astonished at so remarkable a coincidence as that a group of human relics, from such widely distant localities as Oban and France, should be so similar. The harpoons agree not only in the material of which they were made, but also in the shape of the stem, the method of cutting the barbs, and the occasional presence of an aperture on the butt-end.

Similar remains, including a few harpoons, were subsequently found in a shelter situated at the base of a steep rock called Druimvargie, overlooking a marsh in which, some years ago, the remains of a supposed lake-dwelling were dug up. As the lowest portion of this marsh is only a few feet above high-water mark, it would have been an inland bay when the sea stood so high as to wash the entrance to the MacArthur cave, so that the two stations would then have been on opposite sides of a small bay, probably frequented by the same body of hunters. Fig. 23 shows a selection of the worked objects found at Druimvargie from which their similarity to those from the MacArthur cave will be at once seen.

Another locality which has yielded the same class of industrial remains is a shell-heap called *Caisteal-nan-Gillean* in the island of

Oronsay. The shell-heap formed an isolated mound between a range of sand-dunes and the sea, measuring about 150 feet in diameter and on an average 25 feet in height. Its surface was covered with grassy turf, having blown sand underneath to a depth of one to five feet. Below this covering was an accumu-

FIG. 23.—Portions of harpoons and round-nosed chisels of bone and horn from the Rock-shelter of Druimvargie. (All ½.)

lation of shells and bones, mingled with sand and ashes for a depth of about eight feet. Underneath this refuse-heap the substance of the mound was composed of a series of layers of blown sand and a dark mould, with a few sea and land shells, but no implements.

The implements of bone and horn found in *Caisteal-nan-Gillean* consisted of eleven harpoons, three awls and 150 " round-nosed "

chisels, similar to those of the Oban cave. The stone implements, numbering over 200, were elongated water-worn pebbles, worked at one end and supposed to have been used as limpet-hammers (Fig. 24).

Besides the above-named objects there were eight fragments of perforated implements made of deer-horn, and others roughly cut

FIG. 24.—*Caisteal-nan-Gillean* Shell-Heap, Oronsay. Harpoons and objects of bone, horn and stone. (All ½.)

round the circumference and then broken across; also two small anvils and some flint chips, but none that could be called an implement. With the exception of bones of the greak auk, the organic remains were those of the existing fauna of the west coast, among which were red-deer, otter, wild-boar, marten, grey and common seal, cetaceans, limpet, pecten, oyster, cockle, crab—all evidently used for edible purposes.

Two other shell-heaps on the island of

Oronsay have yielded relics and organic remains precisely similar to those of *Caistealnan-Gillean*, one called *Croch Sligach* (shelly mound), and the other *Croch Riach* (grey mound).

These remarkable discoveries in the caves of Oban and shell-mounds of Oronsay were first described by Dr. Joseph Anderson and published in the *Proceedings of the Society of Antiquaries of Scotland* (Vols. XXIX and XXXII).

The Oronsay shell-mounds were explored by Mr. William Galloway some time before 1884, but the results were not published till Mr. Galloway's collection had been acquired by the Scottish National Museum of Antiquities, and thus came under the notice of Dr. Anderson.

Implements of bone and deer-horn of the blunt, chisel-ended type were found in a shell-heap on Inchkeith, and there can be no doubt that a careful search would result in the discovery of other primitive inhabited sites in North Britain yielding remains of the transition period. In *Prehistoric Remains in Caithness*, published in 1886 (Williams and Norgate), Mr. Samuel Laing, joint author with Professor Huxley, describes a number of shell-heaps which he assigned to "the earliest race of human inhabitants of Britain," and regarded their relics and associated fauna as contemporary with the Kjøkkenmøddings of Denmark.

Stray examples of the characteristic har-

poons of Oban and Mas-d'Azil have also been discovered in several other localities in North Britain. One was found in the bed of the Dee, near Kirkcudbright (Fig. 20, No. 2); another in the Victoria cave, near Settle (No. 1); and a third in the vicinity of Newcastle, now preserved in the Archæological Museum of that town (No. 3). Specimens have also been recorded from some of the earlier Swiss lake-dwellings (No. 8) and turbaries (peat-dogs) of North Italy. Number 9 on the same figure is from Laugerie Basse (Dordogne).

Nor is the above the only line of evidence to show that Scotland was inhabited by a race of primitive people who manufactured implements of deer-horn, and lived on shell-fish and such marine animals as chance or strategy brought within their reach, prior to the last land elevation of the country. Implements of deer-horn associated with the skeletons of stranded whales have been found in various parts of the valley of the Forth, localities which at the present time are the most highly cultivated in Scotland. One such implement (Fig. 25), unique of its kind, is preserved in the Anatomical Museum of the University of Edinburgh. It was described by Sir W. Turner in 1889, at a meeting of the British Association then held at Newcastle-on-Tyne. It is made of a piece of stag-horn, 11 inches long and 6½ inches in its greatest girth; truncated at one end and bevelled into a cutting edge at the other, with a perforation not in the middle but a couple of inches nearer

the truncated end. It was discovered in 1877, resting on the skull of a Balænoptera whale, in the course of drainage operations on the estate of Meiklewood, a few miles west of Stirling, and when exposed there was a portion of a wooden handle still in the hole. Shell-heaps have been noted along the ancient but now vanished shores of this valley.

But here a new problem crops up. We have already seen that Palæolithic races inhabited the south of England up to the Magdalénien

Fig. 25.—Perforated implement of stag-horn found associated with the skeleton of a whale in the Casse of Stirling. (11 inches in length.)

epoch, but apparently there is no evidence to show that their descendants continued to live in these regions up to early Neolithic times. No stranded whales associated with deer-horn axes, no shell-middens, or raised beaches with Azilian harpoons, such as we have described in Scotland, are to be found in South Britain. As a solution of this problem I have elsewhere advanced the hypothesis (*Arch. Journal*, Vol. LV, pp. 259–85) that nearly all the evidence on this point is now

practically obliterated by a submergence of the land of South Britain and the opposite coast of Brittany.

But this submergence ought not to be confounded with the extensive subsidence which commenced during the glacial epoch and embraced the whole of Western Europe. That with which we have now to deal was comparatively recent, and probably contemporary with the opposite movement which caused the last raised beaches in Scotland. It was a wave-like undulation which upheaved the north and depressed the south of Britain. At any rate there can be no doubt that a submergence of the land has taken place in the south of England since man inhabited it in proto-Neolithic times. The evidence in support of this statement consists of submerged forests and old inhabited land-surfaces, associated with edible shells, and bones of the stag, hog, horse and *Bos longifrons*, together with rude implements of horn and flint, which are occasionally to be seen at low-water mark in many localities. Such remains have been incidentally described on the coast of Somerset, at Barnstaple in North Devon, at Torbay, St. Bride's Bay, the coasts of Cheshire, Lancashire and Hampshire, the valley of the Thames, and along the shores of Essex and east coast as far north as Holderness. Many of these vanishing landmarks on the eastern shores of England may, however, be accounted for by sea-erosion.

The information obtained from the short

intermittent excavations which are possible within the limits of tidal areas has been supplemented by various industrial operations, such as dock-excavations, submarine tunnelling, borings, etc., which have disclosed former land-surfaces some fifty or sixty feet below present sea-level.

The following extract from Mr. Pengelly's paper, "On the Submerged Forest of Torbay," gives a good idea of this class of evidence: "Similar and coeval forests are well known to exist on the opposite shores of all the British seas and channels. . . . Everywhere the change of level appears to be the same, the stumps *in situ* are always vertical, and the roots have the same relation to the horizontal plain as they must have had when growing. Mixed with the vegetable remains, which are those of species of plants and trees as still exist in the neighbourhood, there have been found the bones of the mammoth, *Bos longifrons*, red-deer, horse and wild-hog. In the Torbay forest a human implement made of the antler of the red-deer was found twelve feet below the surface."

From a recent correspondence which appeared in *Nature* I take the following extracts, which strongly support the above views on the submergence question. Mr. J. Sinel, of Jersey, thus describes excavations in St. Helier (September 19, 1912):

"The soil beneath the town of St. Helier is, in descending order, composed as follows:

"(1) A deposit of blown sand and recent alluvium from 4 feet to 6 feet thick.

"(2) A bed of brown sandy and clayey peat (with relics of Gallo-Roman times).

"(3) A marine deposit consisting of clay, shingle and shell gravel from 2 feet to 5 feet thick.

"(4) A bed of firm black peat and forest remains which ranges from 5 feet to 14 feet in thickness.

"This peat and forest-bed is traceable to the shore, where it forms the well-known 'submerged forest,' thence (as revealed by the dredge) across the channel that separates the island from the continental coast from Cape La Hague to Finisterre.

"This no doubt is all one with the post-glacial submerged forests of the British Isles and North-western Europe in general, for all through the flora and fauna are the same, viz. oak, alder, birch, hazel, Juncus and Equisetum with hazel nuts in profusion. *Bos longifrons*, red-deer and wolf, even *elytra* of the little purplish-green beetle, *Geotropes vernalis*, are present in this layer beneath St. Helier, as they are from extreme north to south throughout the vast forest area.

. . . . .

"Neolithic relics, in the way of stone implements and fragments of pottery, are very plentiful on the surface and in the upper levels of this forest-bed, but, so far as I can ascertain, have never been recorded from the strata beneath. In a series of excavations

now in progress for the foundations of a building in St. Helier, the strata as above described have been cut through and in the blue clay *beneath the forest bed* (which here is eight feet thick) were found Neolithic implements as follows."

After describing a number of worked objects which he considers Neolithic implements, Mr. Sinel goes on to write: "In the same stratum as these, and in a layer of yellow clay which lies beneath, flint implements of decided Chellian, Acheulian and Mousterian types are frequent, but the relics above specified are clearly and decidedly Neolithic.

"As the portion of the forest-bed at this spot must represent the vegetation that first fringed the land as it recovered from the depression of glacial times, and these relics lie beneath it, we cannot but conclude that the Neolithic races date from a period far more remote than has usually been assigned to them, and that they must, in fact, date back nearly into the last glacial period."

In reply to the above, Mr. A. L. Leach, London, writes as follows (October 3):

"The letter of Mr. J. Sinel, in *Nature*, September 19, on the submerged forest-bed in Jersey, deals with several questions of great interest in relation to the submerged forest on the south-western coast of Wales. I hope to publish shortly an account of this forest-bed (so far as it is seen in Pembrokeshire) and the

deposits associated with it, but in the meantime I may state that I have found worked flints—flakes and cores—in two localities on the Pembrokeshire coast in positions which correspond with that of the stratum of blue clay below the forest-bed of St. Helier. These flints were clearly worked by men who inhabited the woodland, now submerged, before the trees fell into decay and formed the peaty mass of trunks, branches, leaves, etc., overlying the true root-bed of the 'submerged forest.' One locality near Amroth in Carmarthen Bay yielded cores and flakes in abundance; the circumstances indicate the existence of a chipping-floor or implement factory on this part of the submerged land-surface, which now, during spring-tides, is covered by no less than twenty feet of water. In the patch of submerged forest recently exposed at Freshwater West, in southern Pembrokeshire, a few small implements were also found.

"Both at Amroth and Freshwater West the flints occurred below the peaty layer in a thin blue slime or clayey silt, which rests in turn upon clayey rubble largely composed of material derived from older superficial deposits. There is evidence that the forest trees in Pembrokeshire are rooted either in unquestionable boulder clay or in a clayey drift allied to the glacial deposits.

. . . . .

"The geological horizon of the worked flints of the Pembrokeshire submerged land-surface appears identical with that of the

Neolithic implements from St. Helier. One of the most important questions that arises is whether these implements are so distinctively Neolithic in character as to exclude the possibility that they may belong to an earlier period."

These extracts clearly indicate the existence of a pre-Neolithic civilization within the submerged area of the English Channel; and there is presumptive evidence to show that a careful examination of the relics will bring out a parallelism between them and the archæological remains of the transition period as recorded from the north of Scotland and the various Azilian stations throughout Western Europe.

This hypothesis is further strengthened by analogous discoveries on the coast of Essex, as shown by the recent discoveries of Mr. S. Hazzledine Warren, F.G.S. (*Anth. Institute*, 1912). Here are submerged strata some of which clearly disclose that they were formerly land-surfaces inhabited by prehistoric people. "We have no evidence to show," writes Mr. Warren, "at what period this submergence commenced, as the record now lies beneath perhaps fifty or a hundred fathoms of water. But the date of its final stage can be approximately fixed by the prehistoric remains which are found on the ancient surface which was then carried beneath the sea. . . . That this surface was inhabited by prehistoric man, down to, and probably far below, low-water mark is proved beyond a doubt by the pre-

historic remains now found upon it. Stone implements are generally distributed over this surface. They are sometimes scarce, sometimes concentrated in considerable numbers on small areas. Not unfrequently the sites of hearths are found; sometimes there are small pits about three feet in diameter and about two feet in depth, the interior filled with wood charcoal, the edges showing much evidence of fire. I suggest that these may possibly have been used for burning pottery. I have found several such on the buried prehistoric surface of East Essex."

Mr. Warren describes some *special sites* on these prehistoric floors, containing large quantities of charcoal, pottery and flint implements, which he regards as evidence of some kind of industry. Beneath one of these special sites on a prehistoric floor there was discovered in 1910 a human skeleton buried in a contracted position and having apparently the hands and feet bound to the body by ropes of sand-grass. The locality in which this important discovery was made is near Walton-on-Naze. Here the sea is disintegrating the coast-line, and in recent times its action has exposed the following strata :

(1) A low cliff of tidal silt eight to ten feet in height.

(2) A prehistoric floor over which were found "worked flints, broken pottery and rounded lumps of burnt clay, the whole mixed with much wood charcoal."

(3) The skeleton was a little over two feet

beneath the prehistoric floor and, according to Dr. Keith (*Ancient Types of Man*, p. 7), was that of a female, five feet four inches in height, with a cephalic index of 78. This could not have been a recent burial, as until the result of recent sea-erosion, the skeleton lay twelve feet below the present surface of high-water mark. From these data the inference of submergence since Neolithic times is too patent to require further comment (see Chap. X).

But when these submerged land-areas and forests were inhabited by a maritime population, who lived principally on the produce of the sea, it cannot be supposed that the inland parts of the country remained uninhabited. Hence we ought to find some traces of these British people both on submerged and unsubmerged habitable areas. Indications of human occupancy on the latter have occasionally been observed by various writers, but the most suggestive evidence which has come under my cognizance is recorded in a communication to *Man* (1910, 48), by Canon Greenwell, F.R.S., and the Rev. R. A. Gatty, LL.B., entitled *The Pit Dwellings at Holderness.*

The foundations of these dwellings were excavated in the boulder clay to a depth of four or five feet, and varied in shape and size, some being as long as forty feet and nine to ten feet in breadth. They are distributed in groups in the vicinity of Atwick, some two miles from Hornsea, and not far from the present coast, but it appears that when they

were inhabited the sea was far away, as no shells or fish-bones were among their kitchen débris. From their number it was evident that the district was then inhabited by a large population. They are now filled in with a dark coloured deposit, the result of mud washed into them by local rainfall. This mud contained no relics of any kind, all the animal bones, implements, and pottery having been found on the floor of the pits.

"After this flooding," writes Canon Greenwell, "had taken place, which either drove out the occupants or found the pits already deserted, they became covered by a deposit of surface soil from fifteen to eighteen inches in thickness. This soil, which equally covered the boulder clay and the pits, has never been in any way broken through, or otherwise disturbed in the spaces occupied by the pits, and, therefore, they must have been dug out and inhabited before the mud was carried into them, and the surface soil had later on accumulated over them. In this surface soil the ordinary implements of flint, and other stones characteristic of the Neolithic Age, and in some measure those of bronze, have been found in fair abundance. On the other hand, neither on the floors of the pits nor in the filling in has any example of the highly finished implements of the Stone Age, or any portion of one of them, come to light.

"This is a very important fact in connection with the time when the pits were occupied. That time can only, however, be

considered as it has a relation to other periods of occupation in the Stone Age in this district, and it must not be attempted to give it a place in chronological time. If the occupation of the pits is considered with reference to other and later periods, when the country was inhabited by early man, it is evident that the people, who had their abode in them, must have been living there a long time before the Neolithic men of the polished Stone Age were settled in the district."

It is scarcely possible to put any other interpretation on the above facts than that the Holderness pit-dwellers belonged to the transition period. As to the presence of rough pottery, it may be observed that pottery was well represented in the débris of the hut-village of Campigny described as typical of this period in France (*Rev. de l'École d'Anthrop.* 1898, p. 402).

Similar evidence of sites inhabited in former times, but now submerged, is abundantly met with in several localities along the shores of Brittany, as at Mont-Dol and the little island of Er Lanic, near Gavr'Inis. From the facts disclosed on the former site M. Sirodot infers that man was an inhabitant of the district when the sea washed the foot of Mont-Dol, that upon the retreat of the sea its exposed bed became overgrown with great forests, and that after a long interval the sea again encroached on the land and submerged the forests within early historic times (*Études Critiques d'Archéologie préhistorique*). M. de

Closmadeuc has shown that on Er Lanic there is a double cromlech in the form of the figure 8, the half of which is now entirely submerged. These deductions seem to be confirmed by the numerous legendary traditions of buried cities which are prevalent in this part of Europe.

According to the Abbé Hamard (*Ibid.*, p. 37), there is an old manuscript, of the eighth or ninth century, preserved in the library of Avranches, in which it is stated that formerly there was, in the vicinity of Mont-Saint-Michel, a dense forest extending six miles from the sea which harboured all manner of wild beasts. Now the whole district is covered by the sea and sand-beds. To show how much the sea has encroached an the land in these parts he reproduces on old map of Contentin, of the thirteenth century, which shows Mont-Saint-Michel a long way inland, the island of Jersey as united to the Continent, and a corresponding increase of land all along the adjacent shores.

When the ethnological problems regarding the immigrations into Britain of Neolithic races fall to be considered we shall have a few further remarks to make on submerged antiquities, and their bearing on the solution of the supposed *hiatus* in the continuity of a human population in Britain since Palæolithic times.

CHAPTER VI

ARTS AND INDUSTRIES OF THE STONE AND BRONZE AGES

Systematic writers on Archæology generally describe the cultural phenomena disclosed by the relics gathered on the inhabited sites and haunts of the prehistoric people of Europe under the three famous ages of Stone, Bronze and Iron. It must not, however, be forgotten that these so-called ages are but undated stages in the sequence of events, each representing a group of objects sufficiently differentiated to be recognized as well-defined phases in the progress of European civilization. This system of classification is founded on the fact that there was a time, in the history of mankind, when all industrial tools were made of stone, horn, bone, teeth, etc. After human organizations continued to exist for many ages with the assistance of such objects as could be manufactured from these limited resources, a discovery was made which ultimately revolutionized all mechanical appliances for cutting purposes, and thus raised the culture and civilization of the people to a higher degree than was previously possible. This discovery was the art of making bronze, which simply consisted of adding 10 per cent. of tin to copper, a process which has the effect of rendering the latter sufficiently hard to give to cutting imple-

ments made of this amalgam a sharp edge. Before this discovery cutting implements made of pure copper had been tried, but they were little better than those made of stone. This preliminary metallic stage—the so-called Copper Age—was not of long duration. It was otherwise with bronze, as its superior qualities for cutting and penetrating purposes became at once apparent. But its general application to the arts and industries was a somewhat slow process, especially in outlying districts, such as Britain, where the new tools and implements had, in the first instance, to be imported at heavy expense. The transition from a lower stage of culture to a higher one involves a series of minor innovations on old customs and mechanical usages, which vary in the course of time in different countries. Hence, the line of demarcation between the different ages is not sharply defined, the result of which is that many of the stone implements formerly in use survived in out-of-the-way districts long after the introduction of their analogues in metal.

Man is not unfrequently defined as a tool-maker, a definition which has the advantage of placing him in a category which excludes all other animals. In virtue of this monopoly he has practically discarded the natural means of self-preservation, with which Nature endowed him, and substituted in lieu of them all sorts of tools and appliances manufactured by his own hands. These mechanical inventions, or rather such of them as have

reached our day, are now of inestimable value to archæologists, as they disclose the technical skill, the capacity of adapting special means to special ends, and the general intelligence of their respective makers.

Implements.—The objects classified as implements include—axes, adzes, chisels, hammers, knives, saws, gouges, scrapers, grinding and polishing stones, domestic appliances, etc.

Axes may be divided into two groups, according as they have, or have not, a haft-hole. The former are rarely made of flint, even in districts where this material is abundant, owing to the difficulty of perforating such a hard substance. The non-perforated axes have a wedge shape with one cutting edge running parallel to the axis of the handle, the other being blunt or roughly pointed. Some, however, have both ends brought to a cutting edge. As a rule they have polished surfaces, with the exception of those made of flint, which are generally ground only at the cutting edge. The members of this group vary so much in composition, finish and dimensions that no two are exactly alike; but yet many of them have so many points of resemblance that certain types are recognized as peculiar to special areas—a fact no doubt due to prevailing local influences and customs. It is marvellous to what precision experts have carried the art of assorting these implements according to their *provenance*. In Scandinavia, owing to the abundance of flint in certain localities, we find specimens

of very large dimensions made of this material, some being beautifully chipped and others finely polished. A few specimens found in Britain assume the form of a modern adze, notably one from Aberdeenshire. It is made of grey flint, finely polished, and finished to a curved adze-like edge at both ends. A few chisels are also to be noted, their characteristics being a short cutting edge and a long slender body.

The perforated axes are worked with care, being nearly all polished, and sometimes ornamented with linear grooves along the margins of the perforated surfaces. They are for the most part made of metamorphic or volcanic rocks, and vary in size from a few inches to ten or eleven inches. They may have a single or double cutting edge running parallel to the axis of the handle. In the former case the blunt end may be used as a hammer, and then the implement becomes an axe-hammer. When the cutting edge is at right angles to the handle the implement is called an adze—a very rare form in Britain.

Knives, saws and scrapers are all made of flint flakes by secondary chipping, and assume a great variety of forms, according to the shape of the flake. Originally the knife-flake and the saw were one and the same, but their specialization into separate tools dates as far back as Palæolithic times, as we find saws among the relics of the reindeer caves of France and the rock-shelter of the Schweizersbild in Switzerland.

Among remains of the prehistoric stone industry in this country the implement most largely represented is the scraper, or "thumb flint." It generally consists of a flake having the thick end worked into a semicircular edge and slanting to its flat face, while the body, or "neck," may be held between the fingers. But sometimes there is no neck, and the implement may be of a discoidal, circular or horseshoe shape. Some have a concave edge and are known as "hollow scrapers," a type of implement hitherto found more frequently in Ireland than in Britain. The tools used for boring have, of course, a sharp point, but otherwise they may be regarded as scrapers.

Of all the materials utilized in prehistoric times, flint was the most serviceable, on account of its hardness, and the facility with which it could be worked into any required shape by the process of chipping. Flint is only found *in situ* in chalk formations, but transported nodules of it are frequently met with in glacial drift deposits and other gravels. It has been proved that the prehistoric people were in the habit of procuring a better quality by mining operations. At Grime's Graves, near Brandon, in Suffolk, and at Cissbury, near Worthing, in Sussex, the disused mines have been discovered and investigated. It appears that shafts had been driven down to the requisite depth from which narrow galleries were run in all directions. In the former, the actual deer-horn picks were found in the face of the cutting, just as the miners left

them, and the marks of the stone axes were seen on the walls of the gallery.

Some sensation was recently created at a meeting of the Society of Antiquaries (May 9, 1912), by Mr. Reginald Smith's paper on "The Date of Grime's Graves and Cissbury Flint-mines," in which he assigns the Cissbury group to the Palæolithic period, chiefly on the following grounds: "Certain finds in stratified deposits both here and abroad serve to link the typical Cissbury celt with the late river-gravel forms, and analogies between other types and those found in French caves suggest placing the Cissbury group in the Aurignac division of the Palæolithic cave period, which, at any rate abroad, was followed by a deposit of loess. Recent finds in France show that 'domesticated' animals existed at that period; and the absence of cold-loving animals such as the mammoth, woolly rhinoceros, and reindeer may perhaps be accounted for by the Gulf Stream; but these animals are also unrepresented on several important French sites. If the above view can be maintained there can be no hiatus question." But this conclusion would follow if Mr. Smith had assigned the Cissbury implements to the transition period to which they clearly belong.

Another class of implement, the use of which is unknown, is the so-called Shetland knife. A mere glance at these objects shows that they possess certain characteristics which place them in a special category among

ancient stone implements. They are large, thin blades, made of volcanic rock known as rock-porphyry, irregularly oval or subquadrangular in form, and highly polished on both surfaces, with the entire margin ground to what may be called a cutting edge. Though no two specimens are precisely alike, there is a general, indeed a striking, resemblance between them all; and only in one instance does the rates between their long and short diameters go beyond six to four inches. Summarizing the details of the various discoveries of these implements, I find that 10 were hoards, each containing 4 to 16 specimens—79 in all. The total number at present known may be stated in round numbers at 100, thus accounted for: 62 in National Museum, Edinburgh; 30 in Mr. Cursiter's private collection; and 8 preserved in museums in London and Copenhagen.

Weapons.—Objects classified under the category of weapons, such as daggers, spears, javelins, arrows, etc., being intended to pierce the body of an animal, resemble each other in having a sharp point; but otherwise they only differ in size, material and the manner in which they were used. The penetrating portion was most frequently made of flint, but sometimes short daggers were made of bone or horn.

Arrow-points may be divided into two classes, according as they have, or have not, a tang for insertion into the shaft, the latter

being further subdivided according as the form resembles a leaf, a lozenge or a triangle—a division which is also applicable to spear-heads. The workmanship on some of these flint objects displays marvellous skill, especially in the execution of what is known as ripple-flaking. Having secured the tip, the warrior, or sportsman, had next to consider how it could be best attached to the shaft or handle. This was generally effected in the case of the arrow by inserting the lower end of the flint into a slit in the wood, and then tying it with a string. Among the lake-dwellers of Switzerland a kind of asphalt was used to keep the head firmly in position. It is perhaps unnecessary to say that the presence of arrow-points implies the other equipments of the archer, viz. the bow, the arrow-shaft, the quiver and the wrist-bracer. Of the three former articles almost nothing has survived in this country, owing no doubt to their decay, but in the Swiss lake-dwellings several specimens of the bow have been found. One from Rohenhausen was made of yew, about five feet in length, and showed the notch for the string at both ends. The wrist-bracer, being made of stone, and therefore not liable to decay, has been found in several localities in this country, generally among the contents of graves. The few objects that may be classified as spear- or javelin-heads differ from arrow-heads only in being a little larger, but seldom exceeding three inches in length. Among weapons may be noticed the so-called

sling-stone, which may be a smooth pebble from the brook, or a flint nodule roughly chipped into a lenticular, discoidal, or globular shape. Hundreds of ovate pellets of clay, generally of the size of a pigeon's egg, burnt and unburnt, have been found on the site of the lake-village of Glastonbury, and are regarded as sling-bolts, or perhaps fire-bolts. Similar clay pellets have been dug up on the site of Ardoch Camp associated with Roman pottery and other Roman remains.

In summing up a critical review of the different theories held in regard to the remarkable series of ornamental stone balls found in Scotland—and only in Scotland—I came to the conclusion that their chronological range extended from the end of the Stone Age down to the end of Paganism in Britain. Their geographical distribution seems to me to have an ethnographical significance. Thus of 111 specimens dealt with, no fewer than 56 were traced to Aberdeenshire, and the rest to the eastern districts of Scotland, chiefly north of the Firth of Forth —the exceptions being three from Lanarkshire, two from the counties of Dumfries, Argyll and Wigtown, one from Islay, and one from Ireland. Now the Scottish area thus defined strikingly coincides with what we know of the home of that most obscure of all the people who formerly inhabited North Britain, viz. the Picts or Caledonians.

Dress and Ornament.—We have no knowledge of any phase of humanity in which the

love of personal ornament does not play an important part in the life of the individual. The savage of the present day, who paints, or tattoos, his body and adorns it with shells, feathers, teeth and trinkets made of the more gaudy materials at his disposal, may be accepted as on a parallel with the Neolithic people of Europe. The ornaments of the latter consisted chiefly of beads, pendants, rings, bracelets, necklaces, etc., made of jet, amber, bone, horn, teeth, etc. Few of such relics have, however, been found in Britain that can be identified as belonging exclusively to them. Teeth are often perforated and used as pendants, especially the canines of carnivorous animals, but such ornaments are not peculiar to Neolithic times, as they were equally prevalent among the later Palæolithic races of Europe. Buttons made of jet, amber, ivory or stone are not uncommon among the contents of ancient graves. They are more or less conical on the upper surface and flat beneath, with a curved V-shaped tunnel, both ends of which open on the under surface. But perhaps the earliest of all methods of fastening garments was the simple bone pin. Then came an elongated piece of wood, bone or horn, with a groove cut round its middle for retaining the string which fastened it to the cloth or skin garment.

Of the more perishable works of the early inhabitants of Britain very little has reached our day. Of the spinning industry the spindle-whorl alone remains as evidence,

but as it has also been used in all subsequent ages, even up to the present time, it possesses no chronological value. Portions of woollen cloth of four or five different textures are said to have been found in a cist at Greenigoe, parish of Ophir, Orkney, along with two beads, one of amber and the other of an opaque vitreous paste. Also Canon Greenwell has recorded the occasional finding of remains of woollen and leather garments in British barrows, as, for example, in a coffin made out of a hollow oak trunk, found in a barrow at Scale House, Craven. For a notice of this coffin, and similar trec-coffins recorded from England and Denmark, I would refer readers to *British Barrows*, pp. 375–7.

Of the pottery used for domestic purposes we know very little. According to Canon Greenwell, "the pottery which has been discovered on the site of dwelling-places is a dark-coloured, hard-baked, perfectly plain ware, without ornament of any kind, is, in fact, just what we would expect domestic pottery to be, and has nothing in which it resembles the sepulchral vessels. And more than this, as far as I know of my own experience or can learn from that of others, no whole vessel, or even fragments, of the ordinary sepulchral pottery of the barrows or other places of sepulchre has ever been met with in connection with places of habitation." Sepulchral pottery will be discussed later on in the chapter dealing with memorials of the dead.

The Bronze Age

The introduction of bronze into the arts and industries of the Stone Age people of Europe speedily revolutionized their whole system of social economy. Not only had all the primitive implements and weapons to be remodelled in accordance with the principles of a metallic *régime*, but new industries and higher artistic aspirations were engendered which, by degrees, greatly modified the commercial and social aspects of life.

That bronze objects first found their way into Britain in the form of cutting implements and weapons imported from abroad there can be little doubt, as the oldest metallic specimens found in graves were made of the best quality of bronze, viz. 10 per cent. of tin to 90 per cent. of copper. Now, since a knowledge of this compound implies a previous acquaintance with its component elements, it follows that progress in metallurgy had already reached the stage of knowing the best combination of these metals for the manufacture of cutting tools before bronze was practically known in Britain. That this skill in the working of metals had not been acquired by the ancient nations on the shores of the Mediterranean without long experience of the qualities of copper and tin, and of the various methods of hardening the former, was demonstrated by the late Dr. Gladstone, F.R.S., at the meeting of the British Association held at Liverpool in 1896.

In a paper on "The Transition from Pure Copper to Bronze made with Tin," he writes as follows: "The use of copper in Egypt can be traced from the Fourth Dynasty, when King Seneferu captured the copper and turquoise mines of the Sinaitic peninsula. Tools made of this metal have been found not only in Egypt, belonging to the Fourth, Sixth and Twelfth Dynasties, but also in Assyria, at Lachish in Palestine, Hissarlick in Asia Minor, and Naqada. Attempts were made to render this copper harder and stronger, and that in three ways. First, the admixture of a large quantity of suboxide of copper or of its formation in the process of smelting, as seen in adzes from Egypt and Palestine, and perhaps Naqada. Second, the presence of a little arsenic or antimony, as shown in many tools from Kahun dating from the Twelfth Dynasty, and from the Sinaitic mines, as shown in a communication to the French Academy by Berthelot a few weeks since. Third, the admixture of a little tin, as at Kahun, the Sinaitic mines, and Cyprus, perhaps not exceeding one per cent. When, however, the superiority of tin, as the hardening material, came to be acknowledged, it was added in larger quantities and formed the alloy known as bronze. Such proportions as 4 and 6 per cent. occur in early specimens, as at Hissarlick, but subsequently about 10 per cent. was usually employed. Tools of this composition are found not only in Egypt during the Eighteenth Dynasty, but in most

countries, and for an immense variety of purposes."

As soon as the metallurgic art had taken root among the prehistoric people of Europe each country began to manufacture its own bronze objects, modelling them, in the first instance, after their analogues in stone, or imported metal specimens. Such a derivative connection can be traced not only between the flat bronze axe and the stone celt, but also between most of the other bronze implements and weapons and their prototypes in non-metallic materials. The original safety-pin occupies an intermediate stage between the primitive bone or bronze pin and the highly ornamented brooches, which were in use among the Celts, Saxons and Scandinavians. Such evolutionary connections are often obscure, until all the intermediate links of a series are exhibited side by side.

In describing briefly the Bronze Age relics we must not fall into the common error of supposing that we are dealing with a brand new civilization. The social organizations already founded by the Stone Age people are simply continued, but carried out with greater efficiency, in consequence of the substitution of bronze in their cutting and penetrating tools for the less effective materials formerly used.

Implements.—The division of axes into flat, flanged, winged and socketed, not only sufficiently defines these forms, so far as any classification is necessary, but also indicates

the chronological order of their development. The flat celt, a mere copy of the stone axes, was the first to spread over Europe, and it is the type of implement most commonly met with in the British Isles. The first alteration made was to raise a flange on each side, probably to improve the manner of hafting; then these flanges became larger and curved inwards until the two nearly met, thus forming two imperfect sockets, one on each side. Coincident with these changes a stop-ridge appears between the flanges, and a loop on the outside margin on one side, the object of which was to fasten it to the handle more securely. Finally we have the single socket, but still retaining the outside loop, which is the culmination of all previous efforts for the better adjustment of the implement to its handle.

The objects described by Sir John Evans under the category of knives are dagger-like blades, with a socket for the insertion of a handle. Specimens of these implements are rare in Scotland, more frequently met with in England, and fairly abundant in Ireland. The almost entire absence of the typical knife-blade within the British Isles is in striking contrast to what we find on the Continent, especially among the relics of the Swiss lake-dwellings. There the knives are large one-edged blades and extremely elegant in form, being always more or less curved, and frequently ornamented with parallel or wavy lines, concentric circles, dots, etc. They

were hafted either by a tang or socket, unless, as it sometimes happened, the blade and handle were cast as one piece.

Chisels and gouges are generally socketed or tanged, and differ from the axes only in being more slender. A few specimens of bronze hammers have been recorded from England and Ireland, all of which have a socket at one end. On the site of the lake-dwelling of Wollishofen, near Zurich, six hammers of this type were among the remains dredged up.

One of the most noteworthy facts in connection with the Bronze Age in Britain is, that neither knives, in the proper sense of the word, nor saws of bronze have as yet been discovered among its antiquarian remains. The small hand-dagger with riveted handle, found occasionally in graves, may have served the purposes of a knife.

I am not aware that a bronze saw has yet been discovered within the British Isles, but flint saws are abundantly met with in the Bronze Age and even in the early Iron Age.

Sickles have been collected in considerable numbers both in Britain and Ireland. They are all socketed, with the exception of one or two specimens from Somersetshire, which appear to have been imported, as they belong to continental types.

A series of implements supposed to be razors have also been discovered within the British area, generally associated with burials. They are roughly oval, often highly orna-

mented with geometrical patterns, and present either a single or double cutting edge. All the Scottish examples are tanged, with the exception of one which has a loop at the end of a stem and semicircular edges. The British specimens have all a strong family likeness, but do not differ materially from the continental specimens, as represented in the lake-dwellings and Terremare of Italy. (For continental forms see *Prehistoric Scotland,* Pl. I, p. 190.)

Weapons.—Bronze daggers are usually of two kinds: (1) those with a thin, flat, triangular or oval blade, generally known as knife-daggers; and (2) those with a blade larger and heavier than the former and having a thick midrib. As a rule both varieties are hafted by rivets to a wooden or horn handle; but there are a few exceptions in which a tang takes the place of rivets.

Another class of weapon, sparingly found in Britain, but frequently in Ireland, is that which Sir W. Wilde calls the "broad scythe-shaped sword." It differs from the dagger in having the two edges unsymmetrical, and also in being attached at a right angle to the shaft, which gives it the appearance of a scythe. Such weapons are supposed to be battle-axes, and may, therefore, be classified with the mace, which is used for hand-to-hand encounters.

Spear-heads are, perhaps, the most abundant weapons among the relics of the Bronze Age in all countries. In Britain they are,

almost without exception, socketed, and gracefully proportioned, but variable as regards dimensions.

The bronze swords found in Britain are nearly all leaf-shaped blades, with sharp points and a flat projection at the hilt containing several rivet-holes, by means of which plates of bone, horn or wood were attached on each side so as to form the handle. These weapons had no guard; and although both edges were hammered out thin and sharpened by grinding-stones, they appear to have been better adapted for thrusting than for parrying or striking. There is another rapier-shaped blade occasionally met with, the peculiarity of which is that it has no projection of the metal into the entire body of the perishable handle, but merely a flattened base to which the handle was attached by rivets, like the knife-daggers.

The most common type of shield found in the British Isles consisted of a circular plate of thin bronze, having a central boss 3½ to 4½ inches in diameter, surrounded by a series of concentric raised rings, with circles of small studs in *repoussé* work between each.

Sir John Evans makes the following observations on the chronology of British shields: "The shields first in use in Britain were probably formed of perishable material, such as wicker-work, wood, or hide, like those of many savage tribes of the present day; and it can only have been after a long acquaintance with the use of bronze that plates could

have been produced of such size as those with which some of the ancient shields and bucklers found in this country were covered. They would appear, therefore, to belong to quite the close of the Bronze Age, if not to the transitional period when iron was coming into use. There are, indeed, several bronze coverings of shields of elongated form, such as those from the rivers Witham and from the Thames, with decorations upon them, in which red enamel plays a part, that have been found associated with the iron swords of what Mr. Franks has termed the Late Celtic Period. Those, however, which appear to have a better claim to a place in these pages are of a circular form." (*Bronze Implements*, etc., p. 343.)

The use of war-trumpets among Celtic races has been often referred to by classical writers, but only a few instruments which can be classed in this category have been found in Britain. In Ireland they are more numerous. They were made either in a solid casting of bronze, or in sections by riveting tubes of sheet metal together. They are classified into two varieties according as the aperture for blowing the trumpet was at the end or side.

Ornaments.—The knowledge of the working of bronze gave a great impetus to the development of personal ornaments and toilet trinkets. Being an attractive metal to the eye, it was readily seized upon for the manufacture of armlets, necklaces, diadems, rings,

pendants, ear-rings, buttons, ornamented pins, fibulæ, etc. Most of these objects belong also to the early Iron Age, as personal ornaments were very scarce in the Bronze Age.

Art of the Bronze Age.—The elements of decoration used in the Bronze Age, as disclosed on objects of metal, bone, jet and pottery, consisted of a combination of incised or dotted lines arranged in herring-bone, chevron, saltire, cross and other rectilinear patterns, so as to produce a variety of geometrical figures. Circles, spirals and curved lines also occur, but they are generally confined to stone-work in the British Isles.

With regard to sepulchral pottery, it may be observed that in addition to incisions made in the soft clay by means of small bone instruments, impressions were often made by stamps. From an inspection of the decorated urns it will be observed that various kinds of stamps were used by the potters of the period, such as a piece of wood or bone worked into dots, small triangles, squares, etc., the teeth of a comb, twisted thread in two or three plies, the finger-nail, etc. The different patterns thus made were generally arranged in horizontal bands round the body of the vessel, especially on its upper and middle parts, in such a variety of ways that no two vessels precisely alike have ever been found. A few socketed celts have been recorded from several localities. These are decorated with concentric circles in relief, the incised pattern being in the mould. But otherwise neither

incised circles nor spirals are to be seen on metal-work in this country—presenting in this respect a marked contrast to the bronze relics of the Scandinavian archæological area.

Of archaic sculpturing on stones and solid rock-surfaces in the form of cups, cup-and-rings, concentric circles, spirals and irregular geometrical figures, there is no lack of specimens in North Britain and Ireland; but although much has been written on the subject, none of the theories purporting to explain their meaning has met with general acceptance.

On analyzing the various decorative elements in these lapidary sculpturings they readily fall to be classified as follows: (1) Simple cups; (2) cup-and-rings; (3) cup-and-rings interrupted by gutter channels; (4) concentric circles; (5) semi-concentric circles; (6) spirals; (7) stars, wheels and enclosed spaces; (8) zigzag, wavy or parallel lines.

Cups vary greatly in size, from about one to several inches in diameter, and from half-an-inch to about an inch and a half in depth. They occur sometimes singly, but generally in groups—often forming the only ornament on a stone—and occasionally in combination with some of the other forms above defined. Simple cups have a wide distribution in Western Europe, comprising the Iberian peninsula, the British Isles, Denmark, Sweden, Germany, Austria, Switzerland and France.

Rings are not so deeply cut as cups, and they may be either complete circles, or inter-

rupted by grooves running from the centre to some distance beyond the outer circle. It is noteworthy that the cup-and-rings with gutter channels have not been found outside the British Isles.

The distribution of spirals, which is remarkable in many ways, has lately attracted much attention throughout Europe. The great development of this ornament in Mycenæ is now generally accepted by archæologists as the result of direct intercourse between Crete, Egypt and the shores and islands of the Ægean Sea, during the Eighteenth Dynasty (1580–1320 B.C.). From these regions there is reason to believe that it spread into Europe by the Danube route. That this was the route by which the spiral ornament reached Bavaria, North Germany and Scandinavia, is proved by the fact that it is not found as an ornament on the bronze remains of North Italy, France and Britain.

CHAPTER VII

EARLY IRON AGE—HALLSTATT—LA TÈNE—LATE CELTIC

THE art of making bronze was probably an Egyptian invention, but its introduction into Britain was, in the first instance, in the form of finished objects of the earliest types, such as the small hand daggers, awls, pins,

etc., which found their way almost simultaneously into the other European countries. But by-and-by these different nationalities began to manufacture bronze objects themselves, as is proved by the discovery of the moulds in which the various articles were cast. Hence, in the course of time, a great development in the bronze industry took place, especially in countries at some distance from the Adriatic, such as Hungary, Switzerland, North Germany, Scandinavia and the British Isles. On the other hand, in Greece, Italy, South Austria and the valley of the Rhone, the bronze industry was cut short by the discovery of another metal, viz. iron, which gradually supplanted bronze in the manufacture of cutting implements. Although iron was known in Egypt about 1500 B.C. it was not utilized to any great extent for industrial purposes in Europe till about the ninth century B.C., by which time the Greeks, Italians, Etruscans, Illyrians and Phœnicians were settling down in their historic homes. No iron objects occur among the relics from the prehistoric cities of Troy, Tiryns and Mycenæ.

During the initiatory stages of the competition between iron and bronze it is probable that the result of the struggle depended on the comparative expense of the production of the respective metals, the former being possibly the dearer of the two. It cannot, however, be supposed that, in the face of the abundance and wide distribution of iron ores,

the economic problem would have long stood in the way had there been no other difficulty to be surmounted. It seems to me that the real hindrance to the adoption of iron in the manufacture of cutting implements was the softness of the metal itself, as, until the method of tempering it, by suddenly plunging it when heated into cold water, became known, tools and weapons made of it would be actually inferior to those of bronze. Polybius (Book II, c. 33) incidentally records a striking instance of the comparative uselessness of untempered blades. In describing the victory of Flaminius over the Insubres, inhabiting Cisalpine Gaul, he informs us that the Romans are thought to have shown uncommon skill in this battle by instructing their troops how they were to conduct themselves. Having learned that the Gallic tribes could only give one downward cut with their long pointless swords (as after this the edges got so turned and the blade so bent that unless they had time to straighten them with the foot against the ground they could not deliver a second blow), the Roman soldiers were instructed to meet the first onset of the Celts with their spears and then use their swords. The result was that, "when the Celts had rendered their swords useless by the first blows delivered on the spears, the Romans closed with them and rendered them quite helpless by preventing them from raising their hands to strike with their swords, which is their peculiar and only stroke, because their blade has no point.

The Romans, on the contrary, having excellent points to their swords, used them not to cut but to thrust; and by thus repeatedly hitting the breasts and faces of the enemy, they eventually killed the greater number of them."

Those who deny the existence of a Bronze Age, as distinct from that of Iron, are in the habit of accounting for the entire absence of iron relics in graves and early habitations by the theory that they have disappeared in consequence of the natural law of decomposition, it being well known that iron is more liable to oxidation than copper or bronze. But this is not an adequate explanation of the facts, as there are many natural conditions in which iron may for a long time resist atmospheric action. It is difficult to believe that steel implements, in such a dry climate as that of Egypt, could have been in use from the earliest times without having left some traces of their existence.

Whatever may have been the causes which kept this useful metal so long in the background, there are indications that on its first introduction into European civilization it was a scarce commodity, and only used in small encrusted bands to decorate bronze objects. It was thus occasionally used among the Swiss lake-dwellers at the stations of Moeringen, Cortaillod, Auvernier and Corcelettes, to ornament bronze swords and bracelets. From these considerations it is evident that the mere knowledge of iron as a metal is not to be regarded as contemporaneous

with its general introduction into the arts and industries of human civilization.

During the Homeric Age iron was known in Greece as a rare and expensive commodity, but in the time of Hesiod it came largely into general use, as we find this author assigning to Hercules, besides armour of gold and greaves of bronze, a helmet of steel and a sword of iron; and to Saturn a steel reaping-hook (*Ilios*, p. 252). As the knowledge of the new metal slowly spread to the outlying districts in the north and west of Europe, partly through commerce and partly through immigrants, and probably through warlike expeditions, it is but natural to expect that antiquarian remains of the period found in Central Europe would disclose the metallurgical changes which had been effected in consequence of the substitution of iron for bronze in their manufacture. On this score archæologists have not been disappointed. Two localities in particular have been discovered which have yielded relics so instructive and characteristic of this transition stage that their names are now universally used not only as generic expressions for the civilizations they respectively represent, but also as standards of comparison for contemporary antiquities. These are the cemetery of Hallstatt, in Austria, and the *Oppidum* La Tène, in Switzerland. Antiquities similar to those found in both these stations are due to the same primary influences, had a wide area of distribution, extending broadly from North

Italy and the Balkan peninsula to the British Isles; so that archæologists, who wish to study the development of the Iron Age anywhere within these limits, have to drink from the same fountain-head. I propose, therefore, to give a short description of a few of the most characteristic remains discovered on these two remarkable stations, noticing at the same time some of the analogous remains found elsewhere by way of defining their respective areas of distribution.

The Hallstatt Civilization.—The ancient necropolis known as Hallstatt lies in a narrow glen in the Noric Alps, about an hour's walk from the town of Hallstatt. Discovered in 1846, and systematically explored for several years under the superintendence of Bergmeister G. Ramsauer, the results were published by Baron von Sacken in 1868, in a quarto volume with twenty-six plates of illustrations.

One of the peculiarities of this cemetery was that it contained burials by inhumation and incineration indiscriminately dispersed over its entire area, both belonging to the same period, as was clearly proved from the perfect similarity of their respective grave-goods. The graves were thickly placed over an irregular area, some 200 yards in length and about half that in breadth, but there were no indications above ground to mark their position.

Baron von Sacken thus describes and classifies the grave-goods :

1. *Armour.*—Swords, daggers, lances, arrow-points, battle-axes, helmets and shields.

2. *Ornaments and Dress.*—Girdles, pendants, fibulæ, clasps, pins, bracelets, finger-rings, ear-rings, hair-rings, spirals, chains, beads of gold, amber and bronze, buttons, various ornamented mountings, amulets and symbols.

3. *Utensils.*—Knives, files, anvils, forceps, fish-hooks, needles, bodkins, nails, whetstones, and polishing stones.

4. *Vessels.*—Caldrons, urns, cups and ladles of bronze; pots, cups and plates of earthenware, and a few vessels of glass.

5. *Diverse Objects.*—Worked stones, clay discs, lumps of bronze and slag, shells, bones of animals, etc.

Many of the weapons though made of iron retained Bronze Age forms, but all the arrow-points were of bronze, most of them with wings and a few triangularly shaped. Arms of defence, such as helmets and shields, were very rare, only two of the former, one with a double crest and the other plain, having been found. Of shields there were only a few fragments of conical bosses. The swords and daggers had sheaths made of beaten bronze, or of wood bound with bronze bands, which were more or less ornamented. Some of the iron swords were of a novel character. The blade of the most remarkable weapon was double-edged, nearly three feet in length, almost of uniform breadth throughout its whole length, and ended abruptly in a point with two short slanting edges. It was riveted

to a handle of bone encrusted with ivory or amber, and terminated in a gilded pommel of large dimensions. Of nine specimens, eight were in graves containing cremated bodies, and associated with them were one or more bronze vases. Other swords, some of iron and some of bronze, especially the latter, were not unlike the leaf-shaped bronze blades so common in the British Isles towards the end of the Bronze Age. There were also iron daggers, with handles of bronze terminating at the hilt in two horn-like projections, and knife-like blades of unusual size, not unlike a butcher's cleaver. The spear-heads were all socketed and mostly made of iron. Like the swords they show a combination of Bronze Age types together with a few new patterns, some of which closely resembled forms prevalent in La Tène.

Among articles of dress, fibulæ were conspicuous both as regards numbers and variety of form. Some were adorned with amber beads, and others had attached to them by chains a number of pendants in the shape of discs, crosses, wheels, miniature axes, and various kinds of animals reminding one of ducks or swans. The spiral fibula, with two or four discs, goes under the name of the "Hallstatt fibula," as it is seldom met with in North Italy, although common south of the Apennines. Bracelets—solid, hollow, or in bands with or without knobs—were very common. One found in a Yorkshire barrow, at Cowlam, and figured by Canon Greenwell,

(*British Barrows*, p. 210) is almost a facsimile of some of the Hallstatt types.

But perhaps the most remarkable objects were the mountings of some girdle bands and a number of large vessels made of bronze. The latter were adorned with geometrical patterns, animal, figures, either engraved or in *repoussé* work, involving a great variety of art elements—points, zigzag lines, concentric circles, spirals, triangles, crosses, stars, wheels, as well as the forms of plants, beasts and human beings. Some of the vessels had round bottoms and others were like pails (*situlæ*), either cylindrical or bulging upwards, and again contracting a little towards the mouth. They had generally one or two movable handles attached to the top like a modern water-pitcher, or small handles fixed to the sides of the vessel. The larger specimens were made of beaten bronze riveted together, and when found they were either empty or contained only bones of animals. The lid of one of the *situlæ* was ornamented with a group of fantastic animals which strongly remind one of the winged animals of Assyria. The cylindrical cists—*ciste a cordoni* of Italian archæologists—have a series of parallel ridges or cordons running round the body. These vessels, which spread over Central and Western Europe to the number of some fifty, but did not reach Britain, were in some places used as cinerary urns.

It may be noted, as a point of some significance, that neither silver nor lead has been

found in Hallstatt. The absence of these metals, as well as coins, has been used as an argument in support of the opinion that the cemetery was discontinued before these metals came into general use, *i.e.* about the beginning of the fourth century B.C. As the most probable date of the commencement of the cemetery is about the ninth century B.C., its duration would thus extend over a period of 500 years. The collection of Hallstatt relics as a whole is thus a mere jumbling together of an assortment of objects, not only influenced by a rapidly progressing civilization, but also by a continuous importation of new materials from Eastern civilizations by way of the Adriatic.

Sepulchral remains more or less analogous to the Hallstatt antiquities have been recorded in various parts throughout Central Europe, while sporadic finds have been discovered in Bohemia, Silesia, Poland, Hungary, Bosnia, Moravia, South Germany, Switzerland, the Rhine district, France and the British Isles.

La Tène Civilization.—The celebrated lacustrine station called La Tène is situated at the north end of Lake Neuchâtel, close to the present artificially formed outlet of its waters (the Upper Thielle). Here is to be seen a gravelly elevation, some 200 yards long by 50 wide, which, before the "Correction des Eaux du Jura," formed the bed of a shallow part of the lake, known among the fishermen as *la tène* (the shallows). As early as 1858, Col. Schwab discovered that these gravels con-

tained numerous antiquities—swords, spears and other objects of iron—totally different from those found on the *Pfahlbauten*, then so prominently before the archæological world; and of these he made a goodly collection. Subsequently Professor Desor directed his attention to the same field of research, and he also collected a large number of objects, among them being Gallic coins and an iron sword-sheath ornamented with three fantastic horses, which at the time excited much interest among archæologists. Further discoveries in the same locality were made by a number of investigators at various times, among them being MM. Dardel-Thorens, E. Vouga, Borel, Wavre, etc.

As the relics found on La Tène were associated with piles, the locality was regarded by local antiquaries as the site of an ordinary pile-structure of the Iron Age; and as such it has been described by Dr. Keller and Professor Desor. In face of the facts disclosed by later researches this opinion can no longer be maintained. As a place of habitation it consisted of a series of rectangular wooden buildings, erected on both margins of an ancient outlet of the lake, and connected by a wooden bridge the piles of which have been traced for a considerable distance. The submergence of the locality, such as it was when its archæological treasures first attracted attention, was due to a gradual accumulation of mud and peat along the bed of the sluggish channel which carried, and

still carries, its surplus waters to Lake Bienne. The geographical position of the site, commanding the great highway between Constance and Geneva, and the vast preponderance of weapons of war among the relics found on it, unmistakably point to its having been a military station. Nor is there evidence awanting to suggest that its end was a tragic catastrophe. The quantity of human bones, representing some thirty or forty individuals, with skulls said to have sword-cuts on their top; the number of abandoned swords, about half of which were unsheathed; the incongruous medley of relics found by M. E. Vouga at the bottom of the ancient river-bed, comprising swords, lances, axes, chains, razors, various wooden implements, fragments of a large vase, an entire wheel and other parts of a wagon, together with the bones of horses and oxen—all indicate that the onslaught was sudden and successful. The discovery of characteristic Roman remains, such as coins, tiles, pottery, bricks (one with the mark of the 21st legion, "Rapax"), on and around the site of La Tène leaves little doubt that the captors of the *Oppidum* were the Romans.

The La Tène culture, having its centre of development considerably to the west of Hallstatt, spread far and wide on the Continent, reaching Scandinavia on the north, the British Isles on the west and Bosnia on the east.

A mere glance at the Hallstatt and La Tène groups of antiquities shows that a gradual

transformation in the relative use of bronze and iron had taken place prior to the occupation of the *Oppidum* La Tène, *i.e.* some time during the first century B.C. The prevailing forms of the Bronze Age were still retained in iron in Hallstatt, while in La Tène they entirely disappeared. In Hallstatt the Bronze Age sword was replaced by a sword only the blade of which was made of iron, while in La Tène both blade and sheath were made of iron, there being only one bronze sheath, so far as known to me, in the whole of the La Tène collections. During the latter period the small bronze dagger, the pioneer weapon of the early Bronze Age in Western Europe, was no longer met with. The leaf-shaped bronze sword, with its flat tongue and rivet-holes, gave place to a tanged iron blade, generally with parallel edges and blunt point. Even the great iron sword of Hallstatt had apparently disappeared from the armamentary of Western Europe. Shields and helmets of iron became then parts of military costume of the day. The superabundance of personal ornaments in the form of iron fibulæ, beads and bracelets of glass, the use of coral as a setting, and ultimately the invention of enamel, etc., show that amber and bronze had then become less necessary. In decorative art geometrical designs gave way to various symmetrical combinations of curves, spirals, involutes and figures of fantastic animals. But the greatest innovation of all was the appearance of the new metal, *silver*, as well

as Gaulish coins, at first imitating those of Greek origin.

Late Celtic Period in Britain.—We now proceed to investigate the archæological phenomena of the early Iron Age, as disclosed by the antiquities discovered within the British Isles. This subject becomes comparatively easy in light of what we have seen as to the sources from which their inhabitants derived the models and art motives which inspired the artistic productions of the inhabitants. The effect of these foreign influences on British civilization was to develop a new school of art, which, though retaining the primary features of its Continental prototypes, presented so many deviations, both in design and execution, that it is now regarded as a third and final stage in the evolution of the Celtic art of Europe. Among the first to clearly define this unique group of antiquities in Britain was Sir A. W. Franks, who, as one of the editors of Kemble's *Horæ Ferales*, named it "Late Celtic"—an expression which has since become common in archæological literature. His description of the principal objects in that group, so far as they were then known to him, is prefaced by the following remarks:

"In the peculiar class of antiquities now to be considered, the British Islands stand unrivalled; a few ancient objects, analogous in design, may be found in various parts of the Continent, and more extended researches in local museums may bring many others to

light, but the foreign contributions to this section are scanty when compared with those of our own country.

"The antiquities under consideration consist of shields, swords, and daggers, horse-furniture, personal ornaments, and a number of miscellaneous objects, some of iron, some of bronze, and frequently decorated with enamel. All these antiquities exhibit a style of decoration remarkable for its peculiar and varied forms, and testify to an extraordinary skill in working metals." (*Horæ Ferales*, p. 172.)

On finishing his descriptive details of the objects in question—the more perfect and highly decorated being delineated on seven plates of beautiful illustrations—he proceeds to show that their original owners could be no other than the Celts.

Since 1864, when Sir A. W. Franks wrote his description of the "Late Celtic" antiquities of the British Isles, a large number of similarly decorated objects have been discovered throughout Great Britain and Ireland. Some have been incidentally found as stray relics in fields, peat-bogs, the beds of rivers, etc.; others were among the contents of hoards or hidden treasures, graves and inhabited sites, associated with other objects which gave a clue to their date.

Among sepulchral sites the following may be mentioned, as examples of burials by inhumation which have yielded relics of this

special style of art: Arras, Cowlam, Grimthorpe, "Danes' Graves," near Kilham, and Scarborough Park, near Beverley (all in Yorkshire); Barlaston and Alstonfield (Staffordshire); Middleton Moor and Benty Grange (Derbyshire); the Cotteswold Hills, near Gloucester; Trelan Bahow, Parish of St. Keverne (Cornwall); Mount Batten, near Plymouth; Bigberry Hill, in Kent, etc. The Urn-field (cemetery) at Aylesford (Kent), described by Sir Arthur Evans, deserves special notice. Among the relics disinterred from this locality was a wooden pail or *situla*, having the upper of three bronze bands which surrounded the vessel, decorated with the forms of fantastic animals and scrolls in *repoussé* work, in the characteristic style of Late Celtic art. The relics also included a jug, a long-handled patella or pan and a couple of fibulæ of late La Tène types—all of bronze. The fibulæ and some cremated bones were inside the *situla*, while the jug, patella and a number of earthenware urns were placed close up to its outside. "We have here," writes the author, "for the first time a native example of an 'urn-field' belonging to the period that preceded the Roman invasion, the immediate antecedents of which are to be sought in the Belgic parts of Gaul."

Another remarkable bucket, which evidently belongs to the same class and period as that of Aylesford, was found near Marlborough about the year 1807, the remains of which are now preserved in the Devizes Museum. When

found it contained burnt bones. Its wooden body, like that of Aylesford, was surrounded by three zones of bronze on which were represented, in *repoussé*, weird human heads, and fantastic horses like those on the famous sword-sheath from La Tène.

This fanciful style of art was rather Gaulish than British, and may be paralleled with the Gundestrup silver bowl discovered, in 1891, in a peat-bog in Jutland, Denmark—the most magnificent work of Celtic art hitherto found in Europe. The plates of which this very remarkable sacrificial bowl had been constructed represented divinities, processions of warriors and oriental designs—elephants, griffins, ram-headed serpent, a man astride a dolphin—together with the symbol of the boar, the triquetra, torques, crested helmets and oblong shields, forming an unmistakable assemblage of the most characteristic elements of Celtic art.

An important find of Late Celtic antiquities in connection with cremated interments was also made at Welwyn, Herts, which, according to Sir Arthur Evans, is a complete parallel to those of Aylesford, both as to date (50 B.C.) and character of the relics. These antiquities are now in the British Museum (*Proc. Soc. Ant. London*, 1912, p. 5).

Chief among inhabited sites of the pre-Roman period which have yielded Late Celtic remains are Hunsbury Camp, near Northampton; an earthen entrenchment at Stanwick (Yorkshire); and Mount Caburn, near Lewes.

From the débris of a series of refuse pits on the first mentioned were dug up 150 querns (hand-mills), charred corn, glass beads, bronze fibulæ and rings, a bronze sword-sheath, spindle-whorls, long-handled combs, loom-weights, bone and horn needles, human and animal bones, etc.

The fine collection of Late Celtic objects from Stanwick includes bridle-bits, horse-trappings, fragments of *repoussé* work, portions of iron chain-mail, a sword-sheath, bronze fragments with traces of enamel on them, tyres of chariot wheels, etc.

Mount Caburn, described by General Pitt-Rivers as a Late Celtic entrenchment of pre-Roman times, contained, in addition to a number of relics similar to those from Hunsbury Camp, three ancient British coins of tin.

Very significant are some implements and weapons of war found on the crannog of Lisnacroghera, Ireland. Here the entire military equipments of at least four men, consisting of shields, iron swords with bronze sheaths, lances with long wooden handles and bronze mountings, and other objects—all beautifully decorated with Late Celtic designs and workmanship—were by some unknown fate associated in a peat-bog with the usual promiscuous objects of an Irish crannog.

In 1865 a remarkable discovery was made in one of the chambered cairns on the Loughcrew Hills, Co. Meath, which has puzzled

many antiquaries. This consisted of a large quantity of flat polished pieces of bone, among which were fragments of combs, and some plaques ornamented with incised circles, spirals, volutes and dots in the Late Celtic style. They were in conjunction with a heterogeneous assortment of objects of stone, bronze and iron, beads of glass and amber, sea-shells, etc.—among them being a pair of iron compasses. (See *Ollamh Fodhla*, by Eugène A. Conwell.)

Remains of Late Celtic work have also been found in peat-bogs, surface soil, on Roman stations in England, and in the débris of some of the crannogs, Pictish brochs, underground dwellings and hill-forts of Scotland.

But among recent discoveries the most important is the Lake-village of Glastonbury, which, having a chronological range of continued occupancy from about 100 B.C. to 50 A.D., has yielded a promiscuous assortment of the ordinary débris of village life during the early Iron Age, among which are some characteristic objects of Late Celtic art such as ornamented hand-mirrors, La Tène fibulæ, bronze bracelets, a few articles of harness mountings, pottery, weaving combs, etc.

A number of massive bronze armlets of a remarkable type, and peculiar to Scotland, have been found in different parts of the country. They consist of a solid casting of bronze, smooth on the inner surface and embossed on the outer by running scrolls in high relief. They are penannular and more or

less oval in shape, with ends rounded, slightly expanded, and perforated with a circular opening for an enamel disc. The decoration usually takes the form of three convex and parallel bands ornamented with trumpet-shaped elevations and connected by oblique ridges. (See *Scotland in Pagan Times*, by Dr. J. Anderson.)

From what we have said it will be seen that the distribution of Late Celtic antiquities embraces a large portion of Great Britain and Ireland. South Britain, however, being its primary home, has proved to be richer in examples of its best style of workmanship, such as the two magnificent shields found in the rivers Thames and Witham, various enamelled horse-trappings, mirrors, brooches, bracelets, torques, etc. From the fact that no settlements or cemeteries of the period have, as yet, been found in Britain north of Yorkshire, nor in any part of Wales or Ireland, it has been suggested that the products of this special art first reached these regions by means of commercial intercourse, rather than by an immigration of new settlers. At the same time, there is evidence to show that it continued to be practised both in Scotland and Ireland, without any break of continuity, till the introduction of Christianity into these regions. There the adherents of the new faith utilized its designs, in conjunction with interlacements and fret-work, to ornament their illuminated manuscripts, sculptured stones, and metal-work. On the other hand, the

people of South Britain, having lost their native art, owing to the rapid spread of Roman influence in that part of the country, had subsequently to borrow its details from the books and writings of the early Christians of Scotland and Ireland.

In discussing some of the archæological problems arising out of the mass of relics found on the site of the Glastonbury Lake-village, I wrote as follows in regard to one or two points which come within the scope of the present chapter:

"The absence of objects ornamented with enamel among the Lake-village relics may have some significance, although it would be hazardous, or at least premature, to draw a definite conclusion from negative premises. That enamel working was practised by the Gauls, prior to the Roman conquest of their country, is proved by excavations made on the site of Bibracte. Here crude enamels, but only of one colour (red), were found in various stages of manufacture, in workshops furnished with furnaces, crucibles, moulds, polishing stones, and other tools used in this industry. *Champlevé* was the first kind of enamelling practised in Britain, the artists using only one colour, a brilliant red, with which they filled the trumpet-shaped spaces of their Late Celtic designs; but this was long after these designs were invented. Many of the specimens of British enamel have been found in association with Roman remains;

while the rest, being mostly sporadic finds, are of no chronological value, so that the precise date when enamel began to be used by British artists is absolutely unknown. We know, however, that during the Roman occupation of Britain the working of enamel was successfully prosecuted. Much has been made of the historical evidence of Philostratus, that the 'barbarians who live in the ocean pour these colours on heated brass, that they adhere, become hard as stone and preserve the designs that have been made in them.' But this was written at the beginning of the third century A.D., and evidently refers to a time when enamel work had made great progress, especially by the adoption of a variety of colours.

"The same reasoning applies to hand-mirrors, the chronology of which is also an unknown factor, as none of the Late Celtic mirrors discovered in Britain, outside the Glastonbury Lake-village, have been shown to be older than Romano-British times. It would, however, be unwise to push these arguments further in the meantime, as the exploration of the Meare Lake-village, the discovery of which has been recently announced, may supply materials which will throw additional light on the various points here raised." (*Glastonbury Lake-Village*, Vol. I, p. 31.)

In casting a retrospective glance over the sources of Late Celtic art, as developed within

the British Isles, it may be observed that the industrial and art products of Hallstatt are somewhat more pronounced in France than in Britain, probably because the former was nearer their eastern sources of distribution. Since these influences first reached French soil there is no reason to suppose that the new developments they engendered suffered any break in continuity till the advent of the Romans. Many of the tumuli, especially in the Marne district, such as that of La Gorge Meillet and Berru, disclosing burials of chiefs clad in full armour and laid alongside of their horses and chariots, must be placed much earlier than the date of the *Oppidum* La Tène; and it is probably to an extension of this custom to Britain that the analogous interments in Yorkshire must be assigned. It was during the La Tène civilization that the iron industry first reached Denmark, so that the Hallstatt period was but feebly represented in Scandinavian lands. This is quite in keeping with the opinion that the bronze industry reached these shores by way of the lower Danube, Hungary, and the southern shore of the Baltic—a route little affected by the Hallstatt civilization.

The same remarks apply to the lake-dwellings of Western Switzerland, many of which were in the full Bronze Age, till their termination during the La Tène period. Thus, while the Bronze Age was flourishing in the north of Europe, other culture currents, emanating from Ægean islands and the mainland of

Greece, long after the Mycenean culture had passed its zenith, spread into Central Europe by way of the Adriatic, and ultimately extended as far as the British Isles.

That the influence of the Hallstatt civilization had not entirely spent itself short of our shores is amply proved by the existence, in the museums of Britain and Ireland, of a number of objects whose origin can be clearly traced to common types in Central Europe. These continental culture and art elements were, however, so handled by the "barbarians in the ocean" as to produce within the British Isles a new school of art, known as Late Celtic, whose products can be readily differentiated from those of all other contemporary phases of European civilization. The most characteristic specimen of this art is the enamelled bronze shield found in the bed of the Thames at Battersea, now in the British Museum, and of which an excellent representation is figured in the Museum Guide.

CHAPTER VIII

RELIGIOSITY AND COMMEMORATIVE MONUMENTS—CROMLECHS, DOLMENS, BARROWS, MENHIRS, ALIGNMENTS, ETC.

THE evolution of religion runs on parallel lines with human civilization, and its consummation into the various codes and creeds

prevalent in the world of to-day is the collective result of generations who have gathered its elements from almost every phase of human life. The precise origin of primitive religion is, however, a controverted problem, and whether its first germs emanated from a belief in magic, or in the existence of gods and demons, or from a conception of the dual nature of man as body and soul, are questions which lie outside the scope of archæology. The most reasonable hypothesis on the subject is the animistic theory, advocated by E. B. Tylor, which represents man as having attained to the idea of spirit by reflecting on various physical and psychological experiences familiar to him as ordinary occurrences of daily life, such as dreams, trances, shadows, hallucinations, breath, sleep, death, etc. The idea that man possessed a material body and a spiritual soul was gradually extended till it applied not only to animals, but to material objects. Certain archæological remains discovered on the primitive homes and haunts of mankind, and now available as evidence of their past career on the globe, are more in harmony with Dr. Tylor's animistic theory than with any other; for, as soon as the dualism of man's nature became a stereotyped belief, the idea that the soul, after somatic death, passed on to the world of spirits, became an inevitable corollary. Hence, both the body and soul of a departed friend had to be attended to by the surviving relatives, the natural sequence to which was

the performance of a variety of sacred and religious duties as homage to his memory, such as a ceremonial burial, the erection of a suitable commemorative monument, and the deposition of viands and such objects as would be serviceable to the soul on its journey to the unseen world. These customs, however, belong to a somewhat advanced stage of human civilization, and until sepulchral monuments and relics became available as evidence, archæologists had no reliable data to combat the idea that, during the nomadic wanderings of primitive races, their dead were disposed of by simple abandonment by the wayside, probably to be devoured by wild animals. Strabo (Book XI, chap. xi, 3) informs us that among the Bactrians, those who were disabled by disease or old age were thrown alive to be devoured by dogs kept expressly for that purpose. The custom of keeping animals for such sacred duties has survived to the present day, as exemplified by the Parsees of Bombay in their Towers of Silence, where the process of *Scarnitura* is completed by vultures in little more than an hour. Some other semi-civilized races dispose of their dead by exposing the corpse on the branches of a tree, which is merely a speedy way of facilitating decomposition by atmospheric agencies.

Formerly it had been generally held by anthropologists that the Palæolithic people of Europe had no religion, because, among the relics disinterred on their inhabited sites, no

idols, graves, or grave-goods had been recognized. But a fresh interpretation of old materials, together with some recent discoveries, have shown that this deduction can no longer be maintained. The sepulchral phenomena associated with some of the skeletons from the Grimaldi caves of Mentone leave no doubt that the bodies had been intentionally buried with their personal ornaments, coiffures, necklets, pendants, etc., made of perforated shells, teeth, fish-vertebræ, pieces of ivory, etc.

Among other skeletons of the Palæolithic period which might be brought forward as evidence of intentional burial, one of the most typical is that discovered in 1908 in the rock-shelter of Le Moustier. The skeleton lay in the attitude of sleep, beneath undisturbed strata of Moustérien Age. The right arm was folded under the head and the left extended. Near the left hand lay a pointed flint implement of the *coup-de-poing* type, and a little farther on a flint scraper. The cranium had the osteological characters of the Neanderthal-Spy race. The face was strongly prognathic, and there was no chin (Fig. 12). The skeleton was that of a young man about 4 feet 10 inches in height, whose wisdom teeth had not yet been developed. Bones of various animals, such as might have been the remains of a feast, and of which a few appeared to have been calcined, lay near the skeleton. Dr. Klaatsch, the expert who examined the human remains, came to the

conclusion that the individual to whom they belonged had been ceremonially buried.

Several interments dating from the Magdalénien and Transition periods have come to light, which had the peculiarity of having the skeletons sprinkled over with a layer of ochre. This was the case with almost all the skeletons found in the caves of Grimaldi, and in the stations of Chancelade, Mas-d'Azil, Brünn (Moravia), and Paviland (Gower Peninsula). That this formed part of some ritual ceremony is now generally admitted by archæologists. The inference from these, and other data now at our disposal, is that some of the earlier Palæolithic races had been in the habit of burying their dead with ceremonious rites, so circumstantially carried out as to suggest that they were the outcome of an already established cult of the dead.

Some writers maintain that the Palæolithic figure paintings on the walls of caves were inspired by religious motives. Notably is this the case in respect of the remarkable fresco discovered on the rock of Cogul, in the valley of the Ebro, in Spain, which shows a group of nine women dancing round a nude man. Their garments disclose a striking likeness to those of the Minoan women, as figured on the fresco paintings on the walls of Knossos. Breuil regards the Cogul scene, as well as some other rock-illustrations found on the south of the Cantabric Cordilleras and the Pyrenees, as a continuation of the cave paintings of France and Spain to the north

of these mountain ranges. Other writers, however, think they must be dated nearer our own time. Some of these rock figures, for example those at Alpera, in the south-east of Spain, represent nude men hunting deer with bows and arrows. These figures are interesting, as being the first evidence we have of the use of bows and arrows in the chase, for the so-called bone arrows represented among Magdalénien débris were only lance-points, propelled by the hand with the assistance of the apparatus known as dart-propeller (*propulseur*).

But it was not till the advent of Neolithic civilization that the disposal of the dead assumed archæological importance, in consequence of the number of sepulchral monuments then constructed. There can be no doubt, judging from the relics associated with these structural remains, that the Britons of that period believed in the existence of a supernatural world which, after death, became the home of the soul or ghost. When a prominent man died, his weapons, ornaments and other cherished objects were placed in the tomb, as well as suitable viands for the soul on its journey to the realm of the dead. These facts show that they did not regard life beyond the grave as differing widely from that on earth. The idea that death was a severance for ever of all social ties and friendships formed on earth, would, probably, be more repugnant to them than to some of the philosophical minds of the present day. To the

former, death was the mere portal to the community of departed heroes and friends, to which they looked forward across the span of human life with hopeful anticipation of a more perfect state of existence. Hence the abodes of the dead were considered of greater importance than those of the living. One of the most common and effective methods of perpetuating the memory of a departed friend was to rear a mound of stones or earth over the grave. As an alternative to a mound the site of the grave was occasionally marked by the construction of some surface arrangement, such as menhirs, stone circles, alignments, ditches, etc. To these customs we owe some of the grandest monuments in the world's history—the Pyramids of Egypt, the topes and *dagobas* of India, the mighty mounds of Silbury and New Grange, the megalithic circles of Stonehenge and Avebury, together with the numberless rude stone monuments known as dolmens, cromlechs, standing stones, etc., scattered along the western shores of Europe from Scandinavia to Africa. Although a strong family likeness permeates the whole series of these sepulchral monuments, they differ so widely in certain districts as to form, structure, position and contents, that to make a systematic classification of them, on the lines of their chronological development, would be an impossible task. One special element which complicates such an inquiry was the custom of cremating the dead, which appears to have originated in Eastern lands

and to have reached the British Isles towards the close of the Stone Age.

Burial by inhumation, *i.e.* placing the body in a hole in the earth and covering it over with the excavated material, was probably the earliest method of disposing of the dead, after religion became a ruling factor in social life. The next step would be to protect the body from the pressure of the surrounding earth. This was usually done by lining the grave with flagstones set on edge, over which a larger one was placed, as a cover—thus forming the well-known cist of the Bronze Age. Sometimes, instead of flagstones, wooden planks arranged in the shape of a coffin were used, and at other times the body was placed in a tree-trunk coffin. This was made by splitting the trunk of a tree of a suitable length into two portions, one of which was hollowed out as a receptacle for the body, the other being used as a lid. Only two or three of these tree-trunk coffins have been found in Britain, among the best known being that of Gristhorpe barrow, the skeleton from which is preserved in Scarborough Museum; but in Denmark no fewer than forty-three have been recorded up to 1895. But the particular material used for protecting the body depended on what was most readily procurable in the neighbourhood. Canon Greenwell tells us that on the Yorkshire Wolds the stone cist, so common in other parts, was almost entirely wanting, because in chalk districts the requisite slabs were

unprocurable. On the other hand, wood is so liable to decay that it is rare to find evidence of its having been used.

The stone-lined grave is perhaps the most widely distributed of all the sepulchral monuments in Britain. From this to the megalithic chamber, with its internal compartments, entrance passage and superincumbent cairn, was an easy transition. But the sequence thus suggested is of little chronological value in dating these monuments, as there is evidence to show that chambered cairns and long barrows were the earliest tombs constructed in this country. Thus, in the counties of Gloucester, Wilts, Somerset, Dorset and some neighbouring localities, there are chambered cairns in which the primary interments were by inhumation, and the human skulls found in them belonged to a dolichocephalic race. Similar chambered cairns, also containing remains of a dolichocephalic race, have been found in the island of Arran; but as regards the analogous groups farther north in the counties of Argyll, Inverness, Sutherland, Caithness and the Orkneys, it has been conclusively proved that cremation and inhumation were carried on simultaneously from their very commencement. This shows that the custom of constructing chambered cairns travelled slowly northwards, and was overtaken by that of cremation. It would thus appear that, subsequent to the construction of the English megalithic chambers, there was a period of

decadence in this kind of architecture in South Britain, during which the well-known barrows of the Bronze Age became the prevailing type of burial. Another inference, and not an improbable one, is that the Neolithic invaders of Britain were already familiar with the art of constructing dolmens and megalithic monuments, before they left their European homes. This view finds support in the fact that nearly all the continental dolmens belonged to the pre-cremation period, and contained unburnt skeletons. Besides the dolmens, which are very numerous in the middle and southern departments of France, there are in various districts throughout the country spacious caverns which had been used as ossuaries and burial-places by the earlier races. Of such memorials the caverns of L'Homme-Mort and Baumes-Chaudes (Lozère) may be instanced as good examples, both of which contained skeletons belonging exclusively to a dolichocephalic people. The dolmens of the Iberian Peninsula are also monuments of the Stone Age, and their interments consisted of skeletons with dolichocephalic skulls—a fact which also applies to the cave-burials of that country, some of which were older than the dolmens. Cremation would thus appear to have reached the Iberian portion of Europe at a comparatively late period in the Bronze Age, as was the case in North Britain.

In Scandinavia the Giant graves, all of which flourished in the Stone Age, gave place during the Bronze Age to large stone-lined

cists adapted for more than one body. But during the early Iron Age both these types of graves were discarded, and the people reverted to simple burial, either by inhumation or after cremation. But in the case of great men their graves were covered over with huge earthen mounds, such as those of Thor, Odin and Freya, at Gamla Upsala and the ship barrow at Gokstad.

In the absence of sufficient data for classifying the abodes and memorials of the dead on some scientific basis, our remarks on this phase of the subject must be restricted to brief notes on a few of the more typical monuments found within the British area.

Cromlechs, or Stone Circles

Of the prehistoric monuments which come under this category of cromlechs, Britain possesses more than any other country in Europe. Although most of them are in a more or less dilapidated condition, archæologists are generally successful in extracting from their extant remains sufficient structural details to give a fair idea of their original forms and dimensions.

Avebury.—The great circle of standing stones at Avebury (Wiltshire) is, or rather was, the largest monument of the kind in Britain, measuring some 1200 feet in diameter. "When perfect," writes the author of *Prehistoric Times*, "this so-called Druidical monument consisted of a circular ditch and em-

bankment, containing an area of 28½ acres; inside the ditch was a circle of great stones, and within this, again, two smaller circles, formed by a double row of smaller stones, standing side by side. From the outer embankment started two long winding avenues of stones, one of which went in the direction of Beckhampton, and the other in that of Kennet, where it ended in another double circle. Stukely supposed that the idea of the whole was that of a snake transmitted through a circle; the Kennet circle representing the head, the Beckhampton avenue the tail. Midway between the two avenues stood Silbury Hill, the largest artificial mound in Great Britain, measuring no less than 130 feet in height. At one time it was probably much higher. From its position it appears to form part of the general plan, and though it has been twice examined, no primary interment has been found in it. On the whole, this appears to have been at one time the finest megalithic ruin in Europe; but, unfortunately for us, the pretty little village of Avebury, like some beautiful parasite, has grown up at the expense, and in the midst of the ancient temple, and out of 650 great stones, not above 20 are still standing."

The remaining monoliths are all of the native Sarsens (which occur everywhere in the district), and show no evidence of having been hewn. They vary in size from 5 to 20 feet in height above ground, and from 3 to 12 feet in breadth.

The outer circles of the two enclosed groups measured respectively 325 and 270 feet in diameter, and in the centre of each was, in one case, a menhir, and in the other a ruined dolmen.

Various opinions have been held with regard to the primary object of the Avebury circles, avenues, menhirs, etc. Dr. Stukely advocated the theory that they are the remains of a Druidical temple, the priests of which were serpent-worshippers; while Fergusson believed that they, as well as Silbury Hill, mark the site of the graves of those who fell in the last Arthurian battle of Badon Hill (A.D. 520). But the majority of archæologists of the present day see no reason for dissociating the Avebury group from analogous remains elsewhere in Britain, many of which are proved to have been burial-sites of the Bronze Age.

Some recent explorations have been made both within and without the great circle, especially in the surrounding ditch, but without throwing much new light on its age or purpose. In the ditch picks made of antlers, similar to those from Cissbury and Grime's Graves, have been found, and an urn of the beaker type was found within the circle.

Stonehenge.—No other monument within the British Isles has given rise to more ingenious speculations, as to its origin, purpose and date of construction, than Stonehenge. The few hoary stones still *in situ* are sufficiently imposing to excite the wonder of

he passing traveller, and mysterious enough to puzzle the antiquary.

Within a circular earthwork, 300 feet in diameter, was a circle of trilithons, 100 feet diameter, formed of thirty hewn monoliths (sarsens), each pair supporting large lintels. About nine feet within this circle, and concentric with it, was another circle, consisting of forty smaller stones of an imported material known as "blue stones." Inside this "blue stone" circle were five groups of huge trilithons, arranged in a horseshoe shape, each consisting of two monoliths bearing an impost. Inside of the latter was a second horseshoe arrangement (originally consisting of nineteen "blue stones"), the centre of which contained a large slab of micaceous sandstone, called the Altar Stone.

The open spaces of these horseshoe arrangements faced towards the rising sun at the summer solstice, and, in line with its prolonged axis in the circumference of the outer earthen rampart, there is the so-called Sun-stone, or 'Friar's Heel." The Sarsen monoliths in the outer circle measured 12 feet 7 inches in height, but the "blue stones" were only about 8 feet high.

Dr. Gowland, who superintended some recent excavations in course of replacing one of the fallen monoliths, came to the conclusion that Stonehenge was a temple dedicated to sun-worship, and assigns its erection to the end of the Neolithic period (2000–1800 B.C.), on the ground that no bronze

implements or relics were found during his explorations.

On the supposition that the "Friar's Heel" was raised to mark exactly the line of sunrise on Midsummer Day when the structure was erected, it would follow, according to well-known astronomical causes, that in the course of time the direction of the line of sunrise would slowly deviate from that of the stone, so that the amount of change being commensurate with the lapse of time, would supply chronological data for determining the age of the building. The solution of this problem has recently been attempted by Sir Norman Lockyer, who calculated that on Midsummer Day, 1680 B.C., the sun would rise exactly over the "Friar's Heel," in a direct line with the axis of the temple and the avenue.

Looking at Stonehenge from the architectural standpoint, I can have no hesitancy in regarding it as an advanced representative of the ordinary stone circles, some 200 of which, great and small, are known within the British Isles. It is, however, differentiated from them all by having hewn stones, capstones, tenons and sockets. That its earlier analogues were chiefly used as sepulchres has been fully established, and this is presumptive evidence that the sepulchral element was, at least, one of the objects for which Stonehenge was constructed; and it was probably for that reason that it was erected on Salisbury Plain, where there already

existed an extensive necropolis of the Bronze Age. Nor would this by any means militate against its supposed use as a temple for consecrating the dead, or for sun-worship, or any other religious purpose.

Callernish.—On the west coast of the island of Lewis there are four stone circles within about a mile of each other, but without any visible connection between them. In 1858 the peat on the site of the principal one, known as the Callernish Circle, which had accumulated to a depth of 5 feet, was completely cleared away; and in course of this operation the workmen came upon a bipartite chamber close to a large standing stone, 17 feet in height, which occupied the centre of the circle. No relics were found in the chambers, except some minute fragments of burnt bone. The circle is 42 feet in diameter and contains thirteen stones, including the central monolith. The special feature of the Callernish monument is that two parallel rows of standing stones, forming an avenue 270 feet in length and 27 feet in breadth, cross the circle from north to south, and a single row, 120 feet in length, crosses it in the opposite direction. The average height of the stones, after the removal of the peat, is 11 to 13 feet.

Stanton Drew (Somersetshire).—This group consists of three circles (two with avenues) and a few isolated menhirs, one of which goes under the name Kingstone. The larger

circle measures 360 feet in diameter, and the others 129 and 96 feet respectively.

The Ring of Brogar (Orkney).—The great circle of Brogar (for there are one or two smaller circles, as well as several tumuli in the vicinity) measures 342 feet in diameter; and when the present writer visited the locality some years ago, there were fourteen monoliths standing and fifteen lying in the heather, out of the sixty which it originally contained. Some of the stones might be about 15 feet high, but others do not rise above the surface more than 6 or 7 feet. Outside the circle there is a surrounding ditch, from 20 to 30 feet wide, and 6 feet deep. Access is got to the interior by two unexcavated portions of the ditch, like roads entering it on opposite sides.

Stennis (Orkney).—Of the twelve stones, 15 to 18 feet high, which the circle of Stennis originally contained there are only two now in position; but a third lies on the ground close to a ruined dolmen. The diameter of the circle was 104 feet, and surrounding it there was a ditch 50 feet wide. A conspicuous monolith, 18 feet in height, stands at a short distance outside the circular area. Somewhere in the vicinity not far off was the famous Stone of Odin, 8 feet high and perforated with a round hole, on which a binding oath used to be taken with hands joined through the hole.

Little Salkeld (Cumberland).—The circle

at Little Salkeld, called "Long Meg and her daughters," is one of the most perfect in England. It measures 330 feet in diameter and contains sixty-seven stones, besides an outside monolith (Long Meg) of sandstone, on which are incised several groups of concentric circles with gutter channels.

Holywood (Dumfriesshire).—This circle has a diameter of about 291 feet, but, like many others, it is not perfectly round. It is locally known as the "Twelve Apostles" although at the present time there are only eleven stones *in situ*.

Burn Moor (Cumberland).—The specimen at Burn Moor has two circles, placed concentrically, and measuring respectively 150 and 100 feet in diameter. This concentric arrangement of the circles is not an uncommon feature among this class of remains. A small circle at Kenmore, near Aberfeldy, is of this type.

Rollrich (Oxfordshire).—Although tradition has magnified the Rollrich circle to the importance of having been "a splendid temple of the Druid priesthood," it is comparatively an insignificant structure. It is 100 feet in diameter and its tallest stone is only 5 feet in height, the average size of the others being only 3 feet.

Mayborough.—A different type of monument is to be seen at Mayborough, near Penrith. This consists of a circular ring-mound entirely composed of an immense

aggregation of small stones enclosing a flat area 300 feet in diameter. The central space is entered by a wide aperture in the ring, and near its middle there stands a fine monolith, one of several known to have formerly stood there. The famous Giant's Ring, near Belfast, is an example of this type; but the ring in the Irish case is made of earth and is larger, having a diameter of 580 feet, while the central object is a fine dolmen.

The above examples will give the reader a general idea of the different types of free standing cromlechs to be met with in this country, though they by no means reveal the details of all their varying features. The smaller stone circles are so associated with dolmens, barrows and cists that they more frequently fall to be described as integral portions of one or other of these sepulchral structures.

When these cromlechs are considered as groups in different districts, though not widely apart, they and their associated structures often disclose different features. Thus the Clava group, near Inverness, have one or more circles of standing stones surrounding a central chambered cairn. On the other hand, the stone circles of Aberdeenshire have no central cairns, but nearly all of them have a large recumbent stone, with a tall menhir at each end, placed in the circumference.

Dolmens, Tumuli, and Barrows

Among memorials of the dead, dolmens take a prominent place in archæological records, not only on account of the large assortment of the relics of past humanity which they have yielded to explorers, but also for their imposing appearance and wide geographical distribution, especially in Western Europe.

A dolmen in its simplest form may be defined as a rudely constructed chamber of not less than three uprights, set a few feet apart, and so arranged as to support a megalithic slab, called the capstone, such as may be seen in the well-known dolmen of "Kit's Coty House," near Maidstone. Between this simple structure and the Giants' Graves, *Grottes des Fées*, *Allées Couvertes*, *Hunnebedden*, *Antas*, etc., there is a graduated series proportionate in size to the number of supports and capstones used in their construction.

If England be the home of the great stone circles, France claims that position for the dolmens, the number of which is estimated at some 4000, distributed over 78 departments; and of this number there are no less than 618 in Brittany. Free-standing dolmens are by no means abundant in the eastern counties of England, but they are frequently met with in the south and west, and in Wales, Anglesey, the Isle of Man, Scotland and Ireland. Although many of them show no traces of

having been embedded in a cairn or tumulus —as was the case of the entire group in the Drenthe of which some fifty still remain in a fairly well-preserved condition—some archæologists maintain that this was the original condition of all of them. The theory also derives support from the fact that throughout the whole area of their distribution many are to be seen in all stages of denudation.

The covered-up dolmens and tumuli vary much in size, ranging from that of an ordinary barrow a few yards in diameter up to Silbury Hill, which is 130 feet in height and over 500 feet in diameter at the base. They also vary in appearance owing to the growth of vegetation, and other surface changes.

The larger chambered cairns and tumuli had entrance passages generally constructed of flags set on edge, characteristic specimens of which have been recorded at Uley (Gloucester), Stoney Littleton (Somerset), Park Cwn (Gower Peninsula), Achnacree (and other cairns in the counties of Argyll and Inverness), the Horned Cairns of Caithness, Maeshowe (Orkney), etc. But between dolmens, cairns, tumuli, barrows, etc., there is sometimes no clear distinction, so much do they overlap in constructive details.

No megalithic chamber, or entrance passage, has been discovered in Silbury Hill, and therefore it remains a tumulus. But at one time Minning Low (Derbyshire) was a large truncated cone, 300 feet in diameter and

covered with trees. Now it appears a double-chambered, free-standing dolmen, described by Bateman, after the soil had been removed, as "exactly of the construction as the well-known Kit's Coty House."

The great chambered cairns with entrance passages were evidently family vaults, and often contained the osseous remains of several generations.

Burial mounds are called "cairns" when their constructive materials consist of small stones, and "barrows" when the material is ordinary soil; but not unfrequently both substances were used in the same mound—a small cairn being often found inside an earthen barrow. Their great diversity in appearance and form gave rise to a number of qualifying epithets, such as "long," "round," "oval," "bell-shaped," etc. Sometimes the mound was surrounded by a ditch, or a stone circle, or by both; and instances are on record in which both these accessories were within the area covered by the mound. In the event of no mound being raised over an interment made in the ground there may be no indication whatever of its presence. This is a condition often met with in the case of urn cemeteries of later times. In burials by inhumation the grave was frequently marked by a standing stone, or a circle of earth or stones. As inhumation and cremation were practised simultaneously, both methods may be found in the same mound.

When the body was burnt the incinerated remains were carefully collected and usually placed in an urn, and then buried, either in the earth, or in a prepared grave. A common practice was to bury an urn in a more ancient tumulus or barrow, and hence these are known as secondary interments. When no urn was used the cremated remains were laid in a little heap in the grave, or in a hole in earth that had already been consecrated, such as a barrow or cemetery. The corpse, thus reduced to a few handfuls of ashes and calcined bones, required no great space for its preservation. Hence sprung up a tendency to diminish the size of the grave, and thus the megalithic chambers gave place to short stone cists containing the body in a contracted position. These stone-lined, short cists generally contained skeletons with brachycephalic skulls, while the chambered cairns contained those of the earlier dolichocephalic race. In the Yorkshire barrows the two races became mixed.

The pottery found in prehistoric burials consists of a variety of vessels, collectively called urns, but as they are found with unburnt, as well as burnt, interments, they could not all be intended for cinerary purposes. Hence they have to be classified according to their ascertained functions. Urns found with inhumed bodies are supposed to have contained food or drink, and are therefore called "drinking-cups," or "beakers," and "food-

vessels." The former are tall (6 to 9 inches in height) and highly ornamented vessels, narrowing from the mouth to near the middle, then bulging and again narrowing at the base. Beakers are almost invariably associated with unburnt bodies with brachycephalic skulls—only two out of twenty-four having been found by Canon Greenwell in the wold barrows with cremated burials. The food-vessel has a wide mouth, a narrow base, and, though shorter, weighs more than the beaker.

The cinerary urns vary greatly in size, form and ornamentation, being generally from 10 to 18 inches in height. They are either narrow-based and wide-mouthed, with a broad overhanging rim, to which the ornamentation is generally restricted; or shaped like a flower-pot and ornamented by one or two parallel ridges round the body. The urns containing the cremated bones are placed in the earth with a flat stone over the mouth, or, in some instances, they are placed mouth downwards covering the calcined bones.

Menhirs, Alignments, etc.

Menhirs.—Standing stones appear to have been erected at all times for a variety of commemorative purposes, such as to mark the site of a burial, a battlefield, or boundary line. Throughout the British Isles such isolated monuments are widely distributed, especially in the less cultivated districts.

Many of them, however, are but remnants of more elaborate structures, such as avenues, circles and dolmens, which formerly occupied the site, but which, in the course of time, have been removed by the ruthless hands of builders and agriculturists.

The largest menhir in Europe is to be seen at Locmariaquer (Morbihan), lying on the ground in four fragments, the aggregate length of which amounts to 67 feet. Originally the monument was one block of granite foreign to the neighbourhood, and according to recent calculations weighed 342 tons. The tallest pillar-stone in Scotland is Clach-an-Truiseil in the island of Lewis, standing 18 feet 9 inches above ground.

In Scotland stones used ceremonially in the act of crowning a king were called *Tanist-stones*, the most famous of which is the Lia Fail, formerly at Scone, but now in Westminster Abbey. Some menhirs were artificially perforated, and associated with these are various superstitious ceremonies. As examples of this class may be mentioned the *Stone of Odin*, which formerly stood near the circle of Stennis; the *Clach-Charra*, or Stone of Vengeance, at Onich near Ballachulish; and *Mên-an-Tol*, in Cornwall.

Alignments.—The most celebrated group of stones known under the name of alignments is to be seen at Carnac, in Brittany, situated in the centre of a district containing the most remarkable megalithic monuments in the

world. The Menec monoliths extend in eleven lines for nearly a couple of miles, where, after a little break, they are supposed to have been continuous with the Kermario group. The only stone monument in England that can be at all paralleled with Carnac alignments is at Ashdown, in the Vale of the White Horse (Berks). Here the stones, numbering about 800, are grouped in three divisions and extend over an irregular parallelogram for 500 to 600 yards in length, and about half that in breadth. Sir Henry Dryden describes several, but smaller, groups in Caithness, as at Garrywhin, Camster, Yarhouse and the "Many Stones" at Clyth (Fergusson, *Rude Stone Monuments*, p. 529). In Britain alignments are more frequently met with in single or double rows leading to, or from, other megalithic monuments which still, or formerly, existed, such as the avenues at Avebury, Stonehenge, Dartmoor, Shap, Callernish, etc. At St. Colomb, in Cornwall, there is a single row, called the "Nine Maidens," which consists of eight quartz stones extending in a perfectly straight line for 262 feet.

Rocking-stones.—Just on the borderland between the works of Nature and Art comes the so-called Rocking-stone, or Logan-stone, which is usually nothing more than an ice-transported boulder, poised so nicely on its rocky bed that gentle pressure by the hand may cause it to rock, or oscillate. Some of these stones had the pivot-like prominence on

which they rested artificially formed, by cutting away a portion of the rock; but, on the other hand, natural causes can produce similar results. The stone itself, acting like an umbrella, protects the central portion of the bed, while weathering is going on all around it. Such stranded boulders, being generally large and fantastically placed on prominences, were pre-eminently calculated to awaken astonishment in the minds of the worshippers of the mysterious works of Nature. Hence the important position assigned to Rocking-stones in the Druidical system of worship invented by Stukely and other antiquaries of the eighteenth century.

The famous Rocking-stone at Pontypridd (Glamorgan), known as the Maen Chwyl, and weighing 9½ tons, was surrounded, about the year 1850, by a stone circle with serpentine avenues, in imitation of Dr. Stukely's Dracontia; and since then the Pontypridd megaliths have become the rendezvous of the adherents of the neo-Druidic cult of the serpent.

In the absence of historical records and scientific investigations it was formerly the fashion to regard all these primitive stone monuments as the work of the Druids, the so-called priests of the Celts. Against the theory that any of them were ever used as altars for human sacrifice, there is *prima-facie* evidence in the care taken to have the smoothest and flattest surface of the stones

composing the chambers always turned inwards. Moreover, cup-marks and other incised markings, when observed on capstones are almost invariably on their under-side.

No chronological sequence has been detected in their construction; nor can their special forms in different countries be said to indicate contemporaneity. The irregular manner in which they are distributed along the seashores of Europe and Africa has given rise to the theory that they were erected by a wandering race called "the people of the dolmens," but of the whence and whither of these peripatetic dolmen builders we have no knowledge.

From these general considerations, together with the accumulative results of recent researches, there can be little doubt that the megalithic monuments of Europe are chiefly remains of the abodes and memorials of the dead.

CHAPTER IX

INHABITED SITES AND PROTECTIVE WORKS

Man is no exception to the law of the organic world which forces all animals to instinctively protect themselves from their natural enemies. We have already seen that during the Palæolithic period caves and rock-shelters were

resorted to as, perhaps, the best and readiest means of securing personal protection, not only from enemies but from the exigencies of a variable climate. When, however, caves and rock-shelters were no longer sufficient to accommodate the increasing families of these nomadic people, the surplus population would have to migrate to localities which might not possess these natural means of shelter. In these circumstances, necessity would compel them to seek or invent some other means of security, the particular form of which would largely depend on the physical conditions of the environment. If stones were abundant they might be used to construct primitive huts, but if these materials failed, their next resource would probably be to dig a circular trench in the earth and to cover it with a timber roof and thatch. If, however, the locality was swampy, or liable to be flooded, it cannot be said that their ingenuity would be greatly overtaxed if they invented the plan of laying cross-beams over a series of supporting piles, so as to raise the floor of the hut above the damp soil. Or, finally, they might construct a chamber entirely underground in imitation of the natural caves. All these methods were adopted by the Prehistoric people of Britain.

In glancing over the inhabited sites of the Neolithic and subsequent people, we find that natural caves were still resorted to, not only as hiding-places in times of danger, but

occasionally as places of usual abode. However, from the earliest times men were in the habit of constructing various kinds of artificial huts, which they often fortified by enclosures of stone, earth or wood. There may be no chronological sequence in the construction and selection of these different kinds of abode, although caves were probably the only places of security of the earlier races of mankind. But caves have been more or less inhabited in all successive ages, concurrently with other kinds of artificial habitations, as we have noted in the case of Kent's Cavern, which afforded shelter to both Palæolithic and Neolithic races up to post-Roman times.

Caves.—Besides the caves of South Britain, already described as the haunts of Palæolithic man, we may mention the Victoria Cave near Settle, Kirkhead Cave on the north shore of Morecambe Bay, Poole's Cave near Buxton, Thor's Cave in Staffordshire, and the Borness Cave in Kirkcudbrightshire, as examples of caves which, after careful exploration, have yielded abundant evidence of having been inhabited as late as Romano-British times.

In the cave of Heathery Burn, near Durham, there was found a remarkable hoard of objects of the Bronze Age, together with two human skeletons, charcoal, and other evidence of human occupancy. Among this varied assortment of relics were a singular socketed knife, socketed celts (and a mould for the same),

spear-heads, armlets, pins, a razor, and one of those large riveted caldrons of the Hallstatt type—all of bronze. In addition to the above there were many other relics, proving that the hoard belonged to the latest phase of the Bronze Age.

Beehive Huts.—The beehive hut consists of a circular or oval building of dry stones, so constructed that each layer of stones overlaps the one beneath it, till the opening of the apex becomes so small as to be closed by one stone. Such buildings, when constructed in the open, are on architectural principles necessarily limited in their dimensions, being only a few feet in diameter; but when surrounded by an accumulation of stones or earth they are capable of attaining a considerable size, as may be seen in the tombs of Mycenæ, Orchomenos and other sites in Greece. Among these Grecian structures that known as the "Treasury of Atreus" measures 48 feet in ground diameter and 48 feet in height.

The invention of the beehive principle dates to the Neolithic period, but, on the introduction of Christianity into Britain, this type of building was found to be so well adapted to the simple wants of the early Christians that it was utilized as a monastic cell. The most perfect example of the primitive Christian Cashel now to be seen is on Skellig Michel, on the south-west coast of Ireland, which contains a church, oratory and several beehive houses—the latter being

still entire. On *Eilean-na-Naoimh* (Island of the Saints), on the west coast of Argyllshire, may also be seen two ruined beehive cells associated with the ruins of a small church. The beehive principle is frequently met with in the roofing of underground dwellings and chambered cairns.

Underground Dwellings.—As places of refuge and habitation underground chambers have been used both in Great Britain and Ireland. In Scotland they are known as "Eirde Houses" or "Weems," in Cornwall as "Fogous," and in Ireland as "Souterrains."

In Scotland such dwellings had a wide distribution, attaining their greatest development in the district between the river Tay and the Moray Firth—a district generally recognized as the original home of the Picts; and hence these underground dwellings are sometimes called Picts' Houses. They are generally met with as isolated dwellings concealed below the surface, but sometimes they occur in groups, as on the moor of Kildrummy, in Aberdeenshire, where nearly fifty were found extending over an area of less than a couple of square miles. They are long, low, narrow galleries, always more or less curved, and gradually expanding, both laterally and vertically, till, towards the inner extremity, they may measure as much as 10 or 12 feet in width, and 6 or 7 in height. They are most frequently built of undressed dry stones, with convergent walls bearing heavy lintels;

but occasionally the walls are made with flags set on end. The narrow entrance, probably concealed by a stone door, sloped down to the floor level of the chamber, but before reaching the latter there was occasionally a second door, often placed at the point where the direction changed. Sometimes a passage branched off from one side of the gallery and led to another chamber, usually of a circular or oval shape. These chambers were frequently roofed in a dome fashion, on the beehive principle, much in the same manner as those of the chambered cairns. Though all built on a uniform plan they are found to vary greatly in dimensions, that at Tealing, Forfarshire, measuring 80 feet in length, 5 feet 8 inches in height, 2 feet 6 inches in width at entrance, and 8 feet 6 inches next the inner end; while the corresponding measurements of one at Kinnord are only 21, 1½, 3 and 2½ feet.

It is the general opinion of archæologists that these subterranean chambers were always associated with surface habitations, whose structural materials, being made of timbers, have disappeared through natural decay and changes due to the cultivation of the land. Striking evidence of such an association was observed in 1859, at Cairn Conan, near Arbroath. Here, an underground structure presented the peculiarity of having, in addition to the usual long curved gallery, a circular beehive chamber attached to it by a low

passage, and to which there was also a second entrance. About six or seven paces north of the underground gallery a circular space, twenty feet in diameter, and rudely paved with flagstones, was detected a few inches beneath the surface soil. This, upon examination, was recognized as the site of a habitation, of which, however, nothing then remained except the floor, and a few relics which its occupants had left behind them. These relics are important in showing that the structures belonged to post-Roman times, for there seems to be no doubt that both the surface and underground remains were part of the same homestead. Among them were the upper stones of a quern mill, two whorls of lead, a portion of a bronze ring, some rudely hollowed stones, and fragments of iron cutting implements. Those from the underground chambers comprised fragments of various kinds of pottery, some wheel-made, a bronze needle, part of a quern, horses' teeth, calcined bones, and a large spiral bracelet of the snake-like pattern—all of which point to Romano-British times.

Outside the British Isles the underground dwellings seem to be unknown, although the statement of Tacitus suggests the prevalence of such hiding-places among the Germans. In discussing the manners and customs of this people he writes as follows (Chap. XVI): "They also dig subterranean caves, and cover them over with a great quantity of dung.

These they use as winter retreats and granaries, for they preserve a moderate temperature; and upon an invasion when the open country is plundered, these recesses remain unviolated, either because the enemy is ignorant of them, or because he will not trouble himself with the search."

Hut-circles.—The habitations known as hut-circles are found in numberless localities throughout Britain, especially on upland moors that have been little disturbed by cultivation. They are generally associated with other prehistoric monuments, such as cairns, cromlechs, beehive houses, menhirs, souterrains, etc. I cannot think of a better way of conveying to readers a general idea of these promiscuous remains than to give a brief account of one or two localities, where they are still to be seen. During a stay of a few days at Penzance the present writer was able to visit the principal antiquities of West Cornwall, the result of which may be thus summarized.

Starting from Penzance and following the Morvah road, we first come to the "Lanyon Cromlech," a free-standing dolmen with a cover-stone 17 feet long by nearly 9 feet broad, and resting on three pillar-stones, 5 feet in height. But this is not its original height, as the cover-stone fell some years ago, and when it was being raised the supports had to be reduced. Before this event it is said that a man on horseback could ride under

the capstone. Half a mile beyond the so-called Cromlech we come on two famous monuments, viz. Mên-an-Tol (holed stone) and Mên Scryfa (inscribed stone). Turning to the left we come to Chûn, where there is a group of interesting antiquities, including a hill castle or fort, a dolmen and an ancient British village.

Chûn Castle is of an oval shape, 180 feet long by 170 feet broad, and consists of two concentric ditches alternating with dry-stone walls. The inner wall is 20 feet thick, and, before it was plundered of its stones more than a century ago, it is said to have been at least 10 feet high. The dolmen, which has its stones covered with a thick coating of lichens, stands in solitary grandeur about 250 yards to the west of the castle. It consists of a large capstone supported on four pillar-stones enclosing a chamber 7 feet in height. It was formerly covered by a tumulus of earth and stones and surrounded by a circle of standing stones.

A quarter of a mile to the east of the ruined castle is the site of the ancient British village of Bosullo, which appears to have been connected with the former by a paved way.

About a mile to the south there are the ruins of another hut-village situated on the slope of a hill at Bodinar, in which, "within the memory of man," there were beehive huts to be seen, but they are all now in

ruins. However, I had the satisfaction of seeing one of the Cornwall beehive huts at Bosporthennis, now the only remaining specimen of a large British settlement, once situated on the side of Carn Galva. The beehive house consists of two chambers, one circular and the other rectangular. The former is 13 feet in diameter, and has no less than three small doors. The roof has unfortunately collapsed, but enough of the wall remains to show the converging system on which the dome was constructed. The latter is connected with the former by a low square door, and measures 9 feet long by 4 feet broad; but it is regarded as a later appendage to the beehive chamber.

The ancient British village of Chysauster, situated in the vicinity of the hill-fortress of Castle-an-dinas, has been partly cleared out, and in the course of these operations evidence of tin-smelting and fragments of Romano-British pottery were discovered.

Another interesting excursion towards Land's End allows the pedestrian to visit the celebrated Logan Rock, some menhirs and castles, and three or four stone circles, including Boscawen-ûn. But without dwelling on these ancient remains, we must pass on to notice the characteristics of the subterranean dwellings in this neighbourhood. A good specimen of them is the "Fogou" at Boleit, on the lower Buryan road, near the ruins of the ancient Manor-house of Trewoof. It consists of a subterranean gallery, 40 feet

long, from which another chamber, at present about 13 feet long, branches off, but whose full dimensions have not been ascertained. The convergent walls are of unhewn stones and covered with large granite slabs.

Another and still more interesting specimen is at Chapel Euny, parish of Sancreed, about 4½ miles from Penzance. Its main features consist of a gallery 60 feet long, 6 feet wide and from 6 to 7 feet high. At one end it gives access to the surface by a small trapdoor closed by a stone, with holes in the side, apparently for barring it, and at the other there is a low passage, 10 feet long, which leads to a beehive chamber, 16 feet in diameter. The floors of the gallery and chamber were paved with flagstones and provided with drains beneath the pavement. During the excavation of these underground structures evidence of tin-smelting, and various relics were found, among the latter being whetstones, hammer-stones, fragments of different kinds of pottery, an iron spear-head, a "pot-hook," and a piece of red Samian ware. On the surface in the close vicinity of these chambers there are the remains of a British hut-village—thus showing, like other examples in this district as well as elsewhere, that there was a relationship between the surface and underground dwellings.

The Cornish and Irish souterrains do not manifest so strongly the single, and sometimes double, curvatures which are so char-

acteristic of those within the Scottish area. But in all other respects they are so similar that their development can hardly be accounted for, except on the supposition of their having a common origin. These trivial differences may be explained by the Roman occupation, the effect of which was to isolate the people of outlying districts, who for a long time retained old British customs, after they were discontinued in the central areas of Britain, in consequence of Roman civilization.

The Hill-fort of Carn Brê, a conspicuous landmark to the east of Chûn Castle and rising to the height of 740 feet, is crowned by a fort strongly protected by inner and outer walls of dry stone. The greatest length of the defensible area is 540 yards and its width is nearly 300 yards. Some years ago extensive excavations were made within this enclosure, mainly with the view of determining the nature of some dozen hut-circles to be seen among some large boulders which lay partly sunk in the ground. But instead of a few nearly a hundred were exposed and examined. The dwellings were rudely circular, generally from 20 to 22 feet in diameter, and their foundations were laid with granite stones. The following is a summary of the objects found in the course of the explorations :

Flint implements and weapons—scrapers, knives, spear-heads and arrow-points. Cores, flakes and chips in great profusion. Upper portion of a quern, pebbles for pounding or

bruising and a small muller. Spindle-whorls of stone and pottery. One perfect stone celt and a number of broken ones. A perforated disc of slate, 4 inches in diameter. Fragments of pottery both hand and wheel made. A bronze ring. A silver denarius of Vespasian.

Previous records of objects from Carn Brê include bronze celts, and gold coins of British kings contemporary with the early Roman emperors.

A few days at Chagford would enable a keen antiquary to visit most of the Dartmoor antiquities — avenues, menhirs, cromlechs, dolmens, and especially a few groups of hut-circles. Of the circles of standing stones, that at Scorhill is the best on Dartmoor. Its twenty-four stones still *in situ*, and eight prone, form a circle 90 feet in diameter. It is the northerly termination of a series of prehistoric monuments extending to the Fernworthy circle, some two miles distant. With regard to the hut-circles and dolmens, till a few years ago little could be said of them, as of the former only broken-down rings of stones arranged in groups here and there were to be seen; and as for the latter they were rifled long ago. The Dartmoor Exploration Committee have, however, within recent years done a considerable amount of spade-work, and from their published reports we gather a few definite facts about these primitive habitations and their constructors.

Grimspound, one of the most perfect settlements on Dartmoor, lies in a semicircular depression in the form of an oval enclosure (154 by 121 yards), and surrounded by a double stone wall which, even in its present ruined condition, rises three or four feet above the surface. Inside this enclosure are the remains of twenty-four hut-circles, two of which are thus described (as seen after excavation) by Mr. Robert Burnard. One of them "is nearly 11 feet in diameter, with a doorway 2 feet 9 inches wide, protected by a low curved wall which was probably roofed. Entering the hut, there is on the right-hand side a raised dais or platform, standing eight inches above the floor of hard trodden-in subsoil. This is supposed to have formed a couch, and with rushes and heather made a comfortable prehistoric bed. Opposite the door is the hearth, and near it a cooking-hole lined with stones set on edge. Almost in the centre of the hut is a small flat stone, which may have served as an anvil for cracking bones, etc., on; or it may have been a footstone for a post supporting the roof. Much wood charcoal was found in this dwelling, together with fragments of flint. No pottery was observed. The other hut—not quite ten feet in diameter—had its floor paved and contained a small cooking-hole and much charcoal. A broken flint knife, much used, was found near the fireplace."

Of the débris of such dwellings scattered

over the more elevated plateaus and valleys of Britain there is no end. They are generally in groups associated with cairns, cists, stone circles, standing stones and frequently protected by enclosures. Near the Loch of Kinnord, in Aberdeenshire, may be seen the ruins of the so-called Pictish town of Davan, which, from the extensive area covered by foundations of all sorts of buildings, must have been a strongly fortified centre of a large and busy population.

The Welsh antiquaries have recently explored the Fortress City of Treceiri, in Carnarvonshire, perhaps the finest of the kind in Britain. The space enclosed is an irregular oval—the walls following the contour of the hill-top—and measures 330 by 125 yards. On being excavated this area was found to be covered with the foundations of primitive dwellings—circular, oval and square—on the sites of which were found fireplaces, raised seats, flint implements, pottery and other evidences of human habitation.

The great prehistoric town of Worlebury, in Somersetshire, was situated on a protruding plateau, with steep sides and a flat top of considerable extent, overlooking the present fashionable town of Weston-super-Mare. Across the neck of this plateau there runs a massive dry-stone rampart 35 feet thick, the *raison d'être* of which was not understood till excavations revealed the existence of numerous cylindrical pits containing

grain—no doubt storing-places in connection with the perishable huts.

Another inhabited site, showing defensive arrangements somewhat similar to Worlebury, is that on St. David's Head, Pembrokeshire, which has been recently subjected to some spade exploration. It had been long known that the extreme end of this headland was strongly fortified by a dry-stone rampart which cut it off from the mainland, and that within the area thus protected were the remains of hut-circles; but as to their age, or who were their constructors, no one seemed to have the remotest idea. The result of the excavations was to show that they belonged to the early Iron Age. The objects discovered on their sites consist of hammer-stones of beach pebbles, flint flakes, scrapers and cores, sharpening stones, spindle-whorls, perforated discs of slate, part of a jet armlet, fragments of rude pottery, variously coloured beads, and a few articles of iron, but no Roman relics.

Few indications of ancient inhabited sites have been hitherto recorded in low-lying districts where cultivation has been practised from time immemorial. Two reasons may be assigned for the apparent absence of hut-dwellings in such localities. In the first place they were constructed, not of stones, but of timbers and clay wattling over depressions more or less deeply excavated in the soil; and in the second place the structural

materials quickly decayed, the pits became filled up with silted material, and subsequent cultivation obliterated nearly all traces of their former existence. Stone implements were frequently gathered in localized spots on ploughed fields, suggesting the sites of some kind of dwellings, but little information can be got from such surface finds.

Mr. George Clinch, who has excavated many prehistoric pit-dwellings of this type on Hayes Common, West Wickham and other localities, within an area of some four miles near the boundary between Kent and Surrey, has put on record the result of his experience, as regards their structure and classification. He divides them into three types, viz.:

1. Large circular pits from 3 to 10 metres in diameter and from 15 to 90 centimetres deep, and surrounded by a well-defined mound. These pits showed no evidence of fire.

2. Large circular pits, similar in every way to those of the first type, but with a low conical mound in the centre, supposed to be for a central pillar to support a roof.

3. Small circular pits, 35 centimetres deep, containing reddened pebbles, charred wood, and other marks of fire—supposed to be for cooking purposes.

Only stone implements were found in the course of his operations, as all articles made of bone, horn, wood and other organic tissues had completely decayed. The flints consisted

of flakes, scrapers, arrow-heads, drills, saws, chips, cores, etc. Of other kinds of stone were hammers, celts and grain crushers. On this evidence Mr. Clinch assigns these hut-circles to the Neolithic Age.

Deneholes. — The much-discussed Deneholes of Kent and Essex are still surrounded by a halo of mystery, owing to the number of theories advanced by different writers to explain their object and uses, the most plausible of which is that they are simply the pits from which chalk had been extracted for industrial purposes. Deneholes are usually met with on the higher ground of the lower reaches of the Thames, the best-known localities being the Hangman's Wood, Abbey Wood, Gravesend, etc. In fact, North Kent and South Essex appear to be studded with them. A Denehole consists of a round shaft, three feet in diameter, sunk through ordinary soil and gravel till the chalk is reached, often at a depth of some sixty feet. The shaft then widens out, like the shoulder of a bottle, and forms a circular chamber, from which galleries branch out in different directions. No relics indicative of human habitation have hitherto been found in any of the Deneholes, although a considerable number have been more or less explored.

Camps and Forts.—Every country in Europe possesses remains of the refuges and strongholds of its early inhabitants. The selection of the site and the kind of works constructed

varied according to the nature of the ground and the materials readily procurable in the vicinity. The hill-forts of Scotland were usually constructed of either stones or earth, seldom a mixture of both being used—a fact strikingly illustrated by the two Caterthun Forts, in Forfarshire. One, the White Fort, is entirely built of stones, though strengthened by surrounding entrenchments; while the other, the Brown Caterthun, is mainly composed of earthwork. And yet they occupy rival summits, facing each other across a deep valley less than half-a-mile wide. In Wales and Scotland stone forts predominate, but in England earthworks are the prevailing defensive works, among which are very large specimens, such as Maumbury Rings (Dorchester), which measures 345 by 330 feet, and Cissbury Camp, on the Downs of West Sussex, which covers not less than 60 acres. One of the best known of these ancient strongholds is the British Camp on the Herefordshire Beacon near Malvern, which takes the form of an irregular oval 1100 yards in length. It contains a citadel entrenched within an array of amazing ramparts, ditches and fortified entrances.

The chronological range of these camps and forts extends from the Neolithic period down to post-Roman and even Norman times; but after the lapse of a few centuries they have all fallen into the category of the unknown, and it is only spade-work that

can now reveal their true history. No one has done more to clear up this point than the late General Pitt-Rivers by his excavations on Cranbourne Chase. This indefatigable explorer has shown that the Bronze Age camps were approximately rectangular—a feature which was formerly supposed to be peculiar to Roman camps. The relics collected in the stratified silt, which had, in the course of time, partially filled the surrounding ditches, furnished valuable data for establishing a chronological sequence in the occupancy of the camps. In this way he was able to classify and differentiate them according as they belonged to the Stone, Bronze, Late Celtic, Roman or post-Roman Ages.

The variety of forts known as "Vitrified Forts" has gathered around it an extraordinary amount of literature, chiefly of a controversial character. The real problem at issue is to account for the vitrifaction which to a greater or less extent is, or rather was, to be seen on the surrounding walls of some fifty stone-built forts scattered throughout the northern and south-western districts of Scotland, covering a broad band stretching from the shores of the Moray Firth to the counties of Argyll and Wigtown. I have satisfied myself, from a practical examination of the more important examples in Scotland, that the vitrifaction was effected by the external application of fire after the wall had been constructed, and that the sole object

was to consolidate a wall which was composed of small stones such as could be gathered around the site. At the vitrified fort of Carradale, in Cantyre, may be seen an uninterrupted portion of wall, upwards of 100 feet in length, which is absolutely consolidated for three, four and five feet from the top. In one or two places, where previous visitors had picked a hole right through the wall, it was clearly seen that the vitrifaction was less in the lower and central parts and disappeared altogether at the base, which consisted mostly of water-worn stones.

Outside the Scottish area the distribution of vitrified forts is somewhat remarkable. Four are stated, on the authority of Dr. Petrie, to be in Co. Londonderry and one in Co. Cavan, Ireland. They are, however, to be found in Brittany and Normandy, Saxony, Bohemia, Silesia, Thuringian Forest and the Rhine district.

Lake Dwellings.—The security afforded by natural islands probably first suggested the idea of constructing artificial abodes in lakes and marshes. But whatever were the precise circumstances of their origin, it is certain that lacustrine dwellings continued for many centuries to be the favourite system of protection adopted by the early races of Europe, wherever the requisite hydrographical conditions were to be found. The plan of construction was to plant a series of upright piles in a selected portion of the shallow

margin of a lake, over the tops of which cross timbers were laid so as to form a platform capable of supporting huts, and sufficiently raised above the level of the lake to be beyond the reach of the waves. A gangway connected the village with the shore. During the Stone and Bronze Ages hundreds of such villages studded the bays of nearly all the lakes of Central Europe north and south of the Alps. But, strangely enough, all these came to a sudden end in proto-historic times.

Within the British Isles they had a different system of constructing lake-dwellings. Instead of using piles to support the hut-bearing platform, they constructed an artificial island of wood, stones, rushes, earth, etc., which formed the foundation of a large wooden house. It is of importance to note that these lacustrine structures, called crannogs in Scotland and Ireland, were of a later date than those of Europe, as scarcely any of the former date back to the Bronze Age. They belong to Romano-British and early mediæval times, and hence they are frequently referred to in historical documents. In Scotland and Ireland crannogs were very abundant, their number amounting to over 100 in the former, and to twice that number in the latter country. Only a few have been recorded in Britain south of the Scottish border, but on the other hand, the discovery of the lake-villages of Glastonbury and Meare in Somersetshire makes up for

their scarcity, as they yielded archæological remains of the greatest importance to British history.

The chronological range of the occupation of the former was confined to the century and a half which preceded the Roman occupation, and its relics are thus the purest exposition of Late Celtic civilization hitherto found in Britain. The village was constructed on peaty ground within a marsh in the form of a gigantic crannog, with foundations and platforms of wood, stones, brushwood, etc., and fortified with wooden palisading. The site of this unique British village occupied a triangular space, measuring between three and four acres, and contained some 90 circular huts, each containing a prepared hearth of stones and clay. The investigation of the village extended over a period of some twenty years, and the results are recorded in the magnificent monograph, in two quarto volumes, just published under the editorship of Messrs. Bulleid and St. George Gray.

The Meare village which is now being investigated appears, from the character of the relics and structure of the huts, to belong to the same chronological horizon as that of Glastonbury.

CHAPTER X

BRITISH ETHNOLOGY

We have already sufficiently discussed the culture, civilization and physical characters of the Palæolithic people of Britain whom we encountered as inhabitants of the western fringe of the great European continent which represented the inhabited land-areas of those days. They were regarded as belonging to the same races as their fellow-hunters on the other side of the English Channel—there being then no water barrier to prevent free intercourse between them and the rest of the people of Europe. Their fossil remains were too scanty and fragmentary to furnish reliable data for founding on them any specific racial distinctions—even the *Eoanthropus dawsoni* is still *sub judice.*

River-bed Race

The first problem we have to consider is, what became of the descendants of these early inhabitants of Britain? Have they died out like the dodo? Or did they emigrate with the reindeer to more congenial lands? To both these questions the answer is in the negative, for reasons annexed. Evidence will be adduced to prove that they continued to

live in their native land, after it became detached from Europe, till the Neolithic immigrants came upon the scene.

It has been also conclusively proved that there was no hiatus in the continuity of human life and civilization on the European continent during the whole range of the successive culture-stages from Moustérien to Neolithic and later times, as shown by the discoveries at Mas-d'Azil, Sirgenstein, the Schweizersbild and many other stations. It now becomes imperative on us to show that a similar state of matters obtained in Britain, although the evidence on which this conclusion is founded may be somewhat different. We have not as yet discovered caves in this country indicating continued occupancy of man during all the stages of progressive civilization. But this is not the only evidence available by which a similar result may be reached. At no time was Palæolithic man an inhabitant of North Britain, but yet we have laid before our readers incontrovertible facts to show that a pre-Neolithic race of savages existed there during the Transition or Azilian period. Who were these troglodyte hunters, shell-eaters and devourers of stranded whales? How did they come to the north of Scotland? Did they come by long sea-voyages, or across the narrowest portion of the English Channel? If by the latter is it not strange that they should forsake the richer lands of England and find their way to Scotland without leaving

any traces of their existence and wanderings behind them? Unfortunately we have no skeletal remains of these primitive people, for we are not justified in assuming that the human skeletons found in the Oban cave were contemporary with the shell-eating troglodytes who frequented it. Here the evidence so far depends entirely on the character of the tools and implements they left among the remains of the marine and land faunas on which they feasted.

Again, it has been conclusively proved that, by a subsidence of the land in South Britain, archæological materials of the highest significance have been for a long time submerged, and so were concealed from the immediate cognizance of modern antiquaries. We now know that man's handicraft-works have been found in widely separated localities which were formerly inhabited as ordinary land-surfaces, but which are now more or less under the level of the present-day sea. Notwithstanding the difficulties involved in subaqueous investigations, modern researches have brought to light, not only a goodly number of worked objects from these old land-surfaces, but actually two skeletons of the individuals who inhabited them, viz. the woman of Walton-on-Naze and the Tilbury man, both of which have already been described, as well as the circumstances in which they were found. The former belonged to the ordinary Neolithic type, and differed little

in physical characters from women of the present day. The body was buried two feet beneath the prehistoric floor, over which eight to ten feet of silt had accumulated since then. The latter lay in a sand-bank, thirty-four feet below the present surface of the land, and above it rested a succession of deposits of silt, peat and old habitable land-surfaces, indicating, on precise geological grounds, the time that has elapsed since the Tilbury man was in life. Dr. Keith, on well-defined archæological data, estimates that 4000 years is the probable antiquity of the Essex woman. He then calculates, from a comparison between the respective depths below sea-level at which the bodies were found, the antiquity of the Tilbury man at not less than 15,000 years. (*Ancient Types of Man*, p. 12.)

On the other hand, Mr. Clement Reid gives in the following extracts a different estimate of the rate of submergence :—

"Our next inquiry (*Submerged Forests*, p. 117) must be into the length of time represented by the series of submerged forests and associated deposits described in the foregoing pages. The newest of them belongs certainly to the age of polished stone, and the earliest also probably comes within the Neolithic Period. Within the period represented by the submerged forests, we have seen that there has been a change of the sea-level to the extent of eighty feet, or perhaps rather more.

If we can obtain some measure of the time occupied, this should give us some approximate idea as to the length of the Neolithic period, and of the rate at which changes of the sea-level can take place."

After descanting on the rapid growth of forests and estuarine silts, he continues :

"It is useless to pretend to any exact calculations as to the time needed for the formation of these alternating strata of extensive silt and marsh-soil; but looking at the whole of the evidence without bias either way, it seems that an allowance of 1000, or at most 1500, years would be ample time to allow. A period of 1500 years may therefore be taken to cover the whole of the changes which took place during the period of gradual submergence. If this is approximately correct the date at which the submergence began was only 5000 years ago, or about 3000 B.C."

Admitting that no change of sea-level has taken place in Britain during the last 2000 years, that the rate of submergence has been in the same localities of a uniform character, that the Essex Woman lived about 4000 years ago, and that eight feet of land-submergence has taken place during the 2000 years this movement was in action, it follows that the rate of submergence at Walton-on-Naze would be four feet per 1000 years. The same rate of submergence, if applicable to the Thames Valley, would make the Tilbury Man's age 10,000 years, and that of the commencement

of the Submerged Forest period 22,000 years.

Now comes important evidence in support of the views advocated in this chapter; and it is so precise and condensed that its recorder, Dr. Keith, will pardon me if I quote his own words, as any abstract would greatly deteriorate their argumentative value.

"To what race of mankind did the Tilbury man belong? He is abundantly represented in the population of modern England. To what race, when we see this type of man in the flesh to-day, do we assign him? He and his successors are ancient British, if you will, but it is better to follow the example of the sharp-sighted Huxley and speak of a type rather than of a race. In 1862, twenty-one years before the Tilbury man was discovered, Huxley had recognized and described a form of prehistoric skull found in England under the name of the 'river-bed' type. The Tilbury cranium is of the river-bed type. The actual specimens described by Huxley are still in the Museum of the Royal College of Surgeons, England; one is from an old bed of the River Trent, near Muskham; another is from a dolmen in Anglesey. Lately another of this type was discovered by the Rev. E. H. Mullins in the floor of a cave in Derbyshire, with bones of the reindeer, and other animals long extinct in England. Indeed, this specimen of the river-bed type from the Langwith cave deserves fuller mention.

for that able scientist, Mr. Martin A. C. Hinton, regards the fauna found with this skull as of the Pleistocene period, and therefore much older than the Tilbury specimen. Another of the same type, also in the Museum of the Royal College of Surgeons, was found beneath a layer of peat and fifteen feet of blue clay when a railway cutting was made in Gloucester. The skull found beneath the limestone deposit of Gough's Cave at Cheddar, Somerset, is also of the river-bed type. All of these are usually assigned to the Neolithic period, and represent the prevailing type of Englishman at the commencement of that period, and probably also in the latter part of the Palæolithic period. The skulls mentioned may represent British men and women living thousands of years apart. They clearly belong to the same race which, for lack of a better, we may name the 'river-bed race.' It is the prevailing type in England to-day, and from the scanty evidence at our disposal we may presume that it has been the dominant form many thousands of years. Remains of the same race have also been found at Schweizersbild in Switzerland. These remains of a Neolithic people have been described recently by Dr. Franz Schwertz. All trace of this race has disappeared in Switzerland, whereas in England, in spite of invasion of Saxon, Jute, Dane and Norman, it still thrives abundantly. Further research will probably show that this race was at one time widely distributed throughout Europe,

where it appears towards the close of the Glacial period."

In addition to the above list of the "river-bed race" I submit another specimen which clearly comes under the same category. This skull was extracted from a rock-fissure by quarrymen, at Great Casterton, in Rutland, and brought under public notice by Mr. Crowther-Beynon, Hon. Secretary of the Rutland Archæological and Natural History Society. Its osseous characters (cephalic index, 73·4) approach so nearly those of the Neanderthal-Spy type that for some time doubts were entertained as to whether or not it belonged to that race. This skull is figured in Vol. XXVI, p. 280, of the *Proceedings of the Royal Society of Edinburgh.*

Could any widely distributed series of skulls be brought together which more effectually proves that these "river-bed" types belonged to the people of the Transition period? How otherwise is their presence to be accounted for? According to Dr. Keith, Palæolithic blood is as rife in the British people of to-day as in those of the European continent—a conclusion which entirely meets with the present writer's views.

Hitherto it was supposed that there was no archæological evidence in support of the theory that Britain was inhabited during the Transition period. The general idea was that the

Palæolithic races, who frequented Kent's Cavern and other caves in the south of England up to the Magdalénien epoch, had, prior to, or rather in consequence of, the submergence of their hunting-grounds, shrunk back to their original home in France. Even the present writer, as late as last year, admitted the possibility of holding such a view, as will be seen from the following statement then made on the subject :

" When Palæolithic civilization began to be curtailed in virtue of cosmic changes in the environment, and new methods of living were forthcoming, it is possible that the British fringe of the Palæolithic population would shrink back to Europe, and thus, for a time, leave a gap in the continuity of human life in Britain." (*Munro Lectures for* 1912, p. 286.)

Since the above was written fresh discoveries have turned the scale in favour of a more satisfactory explanation. I am now of opinion that these " river-bed " people were the descendants of the Palæolithic races who continued to inhabit Britain after the setting in of the milder climate which destroyed the big game on which they formerly depended for sustenance. In the changed circumstances they were gradually reduced to great straits, and had to resort to the produce of the sea-shores as the most readily available source of food, next to small animals,

roots, nuts, seeds, etc. They wandered chiefly along the shores of the British seas, where their haunts, workshops and relics are now mostly submerged. In course of time they pushed their way northward, as far as the Valley of the Forth and the islands on the west coast of Scotland, where they found a rich harvest among the luxuriant faunas of both sea and land. Had the bed of the English Channel been raised some forty or fifty feet, instead of being depressed to that extent, we would probably find many shell-heaps and other remains of feasting along the raised beaches of its shores. The only thing that improved the social life of this primitive population was the incoming of the first Neolithic immigrants from Europe, who brought with them the arts of cultivating plants and cereals, and the rearing of animals in a state of domestication. Henceforth the miserable shell-eaters, and other members of the "river-bed race," became clodhoppers and cowherds to the invaders. They, however, retained to a certain extent the cranial features as well as the culture habits of their forefathers with this difference, that while they had to eat snails and shell-fish, their hunting predecessors fed on steaks of horse- and reindeer-flesh.

Shell-mounds may belong to any age, but it is to be noted that those of the early Transition period, such as the Kjøkkenmøddings of Denmark and Portugal, contain no bones of

domestic animals, nor any of the cultivated cereals, nor pottery.

The few instances of food refuse-heaps here brought forward as evidence, in support of the theory that the people of the Transition period were the surviving remnants of the old Palæolithic people of Britain, are by no means exhausted, and I believe that a more careful investigation of promising ground, especially submerged forests and old habitable land-areas, would produce further corroborative materials. Shell-mounds on land are not readily recognized, being often covered with a coating of decayed vegetation, but nevertheless they exist in many localities along the shores of Britain and those of the adjacent continent. On this phase of the subject Mr. Clement Reid's book on *Submerged Forests* may be consulted with advantage. Although the best lesson to be derived from his large experience is to show how much more remains to be done in such matters, especially by carefully watching the contents of dock-excavations.

If we glance for a moment at the earlier archæological discoveries in this country, we shall see that they bear out the above interpretation of the facts. As early as 1850 Sir Daniel Wilson maintained, as the result of an investigation of the craniological materials then available, that the earliest British people were characterized by markedly elongated and narrow skulls, to which he gave the

name *kumbecephalic*; and that after a time a brachycephalic people appeared on the scene, who, though still practising the simple methods of living prevalent in the Stone Age, were to some extent acquainted with the use of bronze. Through the researches of Bateman, Thurnam and Davies, Busk, Greenwell and Rolleston, Boyd Dawkins, Huxley, Mortimer and others, archæologists have been long conversant with the fact that, as a rule, the crania found in the chambered cairns of Wiltshire, Somerset, Gloucester, and some adjacent localities were dolichocephalic; but, on the other hand, that both forms were found in almost equal proportions in the round barrows and other graves of the Bronze Age. Although Dr. Thurnam's aphorism, "long barrows, long skulls; round barrows, short skulls," is not strictly accurate, it undoubtedly conveys an important ethnological fact, which is thus stated by Professor Rolleston: "In no skull from any long barrow, that is to say, in no skull undoubtedly of the Stone Age, examined by us, has the breadth been found to bear so high a relation as that of 80 : 100 of the length." The more recent discoveries of human remains in the Oban caves, the chambered caves of Arran, and the Wick Barrow (Somersetshire) also lend support to the same view.

With regard to the contemporary ethnology of Ireland, Sir W. Wilde expressed the opinion that two races existed simultaneously in that

country, viz. a long-headed, dark Irish stock, on the west of the Shannon, and a fair-haired, globular-headed stock, on the north-east of that river. But this precise distribution of the different races has not been corroborated by subsequent researches. So far as I know, the opinion of Professor Huxley, published forty years ago, still holds good. "As the evidence stands at present," writes the Professor, "I am fully disposed to identify the ancient population of Ireland with the long-barrow and 'river-bed' elements of the population of England, and with the long-headed and 'kumbecephalic' inhabitants of Scotland; and to believe that the 'round-barrow' or Belgic element of the Britannic people never colonized Ireland in sufficient numbers to make its presence ethnically felt." The fact that the beaker type of sepulchral ceramic has very rarely, if at all, been found in the prehistoric burials of Ireland, together with the rarity of brachycephalic skulls from that country, supplies fresh evidence in support of the above exposition of Irish ethnology by Professor Huxley. As cremation advanced the beaker type of ceramic would be gradually superseded, and this might have taken place before these Goidelic invaders had penetrated as far as Ireland and found time to revolutionize the life and language of its original inhabitants.

According to Dr. Thurnam's cranial statistics, the range of the cephalic index

in sixty-seven skulls from long barrows was 63 to 79, and in seventy from round barrows 74 to 89. There was thus no dolichocephalic skull in a round barrow, and no brachycephalic skull in a long barrow. Later researches have, however, entirely disproved the idea that long skulls were confined to long barrows, for, of the four typical long skulls from Canon Greenwell's collection of crania from the Yorkshire barrows, specially selected by Dr. Rolleston for description and illustration, three were taken out of round barrows.

Dr. Thurnam calculates the mean height of the dolichocephalic men of the long barrows to have been 5 feet 5 inches, and that of the brachycephalic men of the round barrows to have been 5 feet 8 inches. On the other hand, according to measurements by the late Mr. Mortimer, of thirty-four dolichocephalic and twenty-eight brachycephalic skulls taken from barrows on the mid-wolds of Yorkshire, the dolichocephalic people were taller by 1·2 inches than the incoming round heads. (See *Glastonbury Lake-Village*, Vol. I, p. 35.)

Neolithic and Bronze Age People

We now come to inquire who were the first Neolithic invaders of Britain, and how they came to be dolichocephalic, whereas the next immigrants into the country were brachycephalic? What relationship existed between these two very different races, and what were

their physical and cultural characteristics? These problems open up a wide field of facts, theories and speculative inferences, utterly beyond the modest scope of this book. We can only hope to call attention to a few guiding landmarks. Our first object is to find a few inhabited sites disclosing the physical characters of the Palæolithic people and the brachycephalic hordes who, from time to time, found their way into Europe from Eastern lands, before their respective racial characters became blended by marriage and social intercourse.

M. Dupont describes the *Trou du Frontal* as the burying-place of the reindeer-hunters inhabiting the *Trou des Nutons*—the latter being a large cavern situated about 200 metres lower down the valley. The former is a small recess at the end of a rock-shelter which had in front of it deposits containing relics of different ages. The cavity measured two metres in depth and one metre in height and breadth, and contained the remains of sixteen human skeletons, five being those of children. The bones were disconnected before being deposited, as none was in its normal anatomical position. A human jaw, for instance, had been broken into two portions. One portion, having a whitish appearance, lay in one part of the vault, and the other, having a brown colour, was found at some distance from the former, but yet, when brought together, the portions fitted exactly. A large

slab placed in front converted the recess into an ossuary. The skeletons were pronounced by Pruner-Bey to belong to a Mongoloid race. The skulls were apparently of a mixed character—more brachycephalic than dolichocephalic; but only two, a male and a female, were sufficiently entire to yield correct anatomical details. At the entrance to the cave, and inside it, were found some twenty worked flints, perforated pendants of fluorine, many shells from Eocene formations (perforated), two plaques of sandstone with incised ornamentation and a globular vessel, or urn, restored from fragments of coarse pottery. M. Dupont, probably influenced by Lartet's opinion of the analogous sepulchral cavern of Aurignac, regarded the *Trou du Frontal* as a cemetery of the Palæolithic hunters of the Reindeer period. But, because of the brachycephalism of the skulls, the pottery and the associated relics, it is now generally believed to have belonged to the early Neolithic Age. The point to be noted here is that already two races are represented in the community who owned this cemetery.

One of the most useful contributions to prehistoric craniology is a statistical list of the Neolithic crania of Gaul drawn up in 1895 by Philippe Salmon. In looking into the details of these tabulated crania some striking facts are brought out. Thus there are some stations, especially among sepulchral caverns, which contained only dolichocephalic skulls,

while others were restricted to brachycephalic types. A large majority of them, however, included long, intermediate, and short types of skulls in various proportions. The two most remarkable stations which contained only long skulls were the caverns of L'Homme-Mort and Baumes-Chaudes, both situated in the department of Lozère. The details of their exploration and osseous contents have been recorded by Drs. Broca and Prunières.

In the cavern of L'Homme-Mort there were nineteen skulls sufficiently well preserved to furnish the necessary measurements. The cephalic indices of seventeen of these varied from 68·2 up to 76·7, and of the other two they were 78·5 and 78·8. There were, therefore, no brachycephalic skulls in this sepulchre, so that the race was comparatively pure. It may also be mentioned that some of the crania had been trepanned—a feature which, though at first overlooked, subsequently became the subject of much interest to anthropologists. The animal remains were those of the Neolithic epoch, but among them were none of the reindeer, horse, ox or stag. Among the relics were a lance-head and a portion of a polished stone axe. Drs. Broca and Prunières were of opinion that the individuals whose remains were consigned to this ossuary belonged to an intermediate race, who flourished in the Transition period, and thus became connecting links between the people of the reindeer caves and the dolmens.

The cavern of Baumes-Chaudes contained a vast collection of human bones, representing some 300 individuals. It was regarded by the investigators as a family burying-place, which had not been altogether abandoned till the beginning of the Bronze Age, as one of the skeletons in the upper deposits had beside it a bronze dagger. The crania measured and classified from this ossuary amounted to thirty-five, and all of them were dolichocephalic. The average height of this race was calculated to be about 5 feet 3½ inches. On the other hand, in the cavern of Tertre-Guerin (Seine-et-Marne) only two skulls were found and they were highly brachycephalic, with cephalic indices of 86·6 and 91. The archæological remains in this cavern comprised polished stone celts, with and without horn-casings, together with various other relics indicating an advanced Neolithic civilization.

We thus see that in post-Palæolithic times there sprang up over Western Europe, as the result of the social contact of two different populations—one dolichocephalic and the other brachycephalic—a mixed people who between them founded the Neolithic civilization. At first there was a preponderance of the long-headed races among them, but as the flow of new-comers from the East continued, this cephalic feature was in some localities reversed, especially in Central and Eastern Europe. It was a colony of this mixed population in Europe, but mostly long-headed

people, who first invaded Britain. They were in the early stage of Neolithic culture, manufactured pottery which was occasionally deposited in graves, possessed some knowledge of agriculture and the art of rearing domestic animals, and disposed of their dead by inhumation in megalithic chambers. These invaders hailed from some part of the European continent, possibly the Iberian Peninsula, and entered Britain by way of Kent, and spread westwards to Somerset, Wilts, Gloucester, etc., ultimately reaching North Britain and Ireland. They found the island already inhabited by the descendants of its former Palæolithic inhabitants, but in sadly reduced circumstances. As already mentioned, they were the people, whose stray skulls have been occasionally met with and recorded by Huxley and Keith under the name of "river-bed" type. It would appear that both they and the invaders consorted together and lived on friendly terms till the invasion of Britain by the brachycephali, who thus added another racial element to the already mixed population of the island.

Of the pottery manufactured by the Neolithic people of Britain, prior to the advent of the Bronze Age civilization, we know very little owing to the scantiness of its remains. From the few specimens that have been found in graves, the vessels seem to have round bottoms, slightly bulging bodies, and wide mouths, with little ornamentation

—totally different from the ceramic of the Bronze Age.

Tacitus informs us that he identified the Silures, a people then occupying South Wales, as Iberians, on account of their swarthy complexion and curly hair. The inference that the Silures were the descendants of the long-headed British immigrants is not unreasonable, more especially as by that time the eastern parts of Britain had been taken possession of by successive waves of Gaulish and Belgic people from the Continent, thus causing the earlier inhabitants to recede more and more westwards. If this be so, it follows that the long-headed man of the chambered cairns of Britain and Ireland had a swarthy complexion with dark hair and eyes, like so many people still living on the more secluded and out-of-the-way portions of the British Isles.

The brachycephalic invaders of Britain are described as having light hair and a fair complexion, but there is no archæological evidence to justify this assertion. They buried their dead in short cists and round barrows and had a knowledge of bronze. According to the Hon. John Abercromby (*A Study of the Bronze Age Pottery*, 1912) they hailed from the Rhine district, and introduced the type of sepulchral ceramic known as the Beaker, or drinking-cup. This vessel was almost invariably deposited beside the body, and is supposed to have contained

food for the soul of the departed on its way to the other world. These people are also supposed to have entered Britain by way of Kent, and to have spread northwards, keeping more to the east coast till they reached the Yorkshire wolds, where their remains are exceptionally abundant, and ultimately Scotland. While these new-comers were quietly settling down, apparently in harmony with the long-headed population, the custom of cremating the dead spread over the land with the rapidity of a religious epidemic, reaching North Britain before the dolichocephals had barely commenced the construction of their chambered cairns.

The Brythons

At a considerably later period, but not many centuries before the Roman occupation of Britain, another set of immigrants from the opposite shores of France gradually spread over South Britain, where they also mingled with its previous inhabitants. These new-comers were the Brythons of modern authors, who are regarded as an offshoot of the Galli of classical writers—probably the Belgæ of Cæsar. Their entry into Britain was during the Early Iron Age, and so they are credited with having introduced the technical elements of the civilization known as Late Celtic. The Brythons differed from the preceding brachycephalic invaders in having

dolichocephalic heads—a statement which is supported on archæological evidence, as, for example, a number of skulls found at Danes' Graves, Arras, etc., in Yorkshire. A skull from one of the Arras tumuli, and containing relics characteristic of the Late Celtic period, is described by Dr. Thurnam as having a cephalic index of 73·7. They were a branch of the later Celts or Galli, whose very name at one time was a terror in Europe. Classical writers describe them as very tall and fierce-looking, with fair hair, blond complexion and blue eyes.

The next and last of the racial elements, which entered into the ethnic composition of the British people of to-day, were the successive Teutonic invasions from Germany, Denmark and Scandinavia, all belonging to a tall, blond, dolichocephalic people who existed in Central Europe from time immemorial—possibly the descendants of the Cro-Magnon race of the late Palæolithic Age.

Conclusion

From these facts and observations we see that at the dawn of Neolithic civilization there extended over Western Europe a primitive population living on shell-fish, the produce of the chase, seeds, fruits, roots, etc., varying according to the natural resources of the environment. At an early stage their domestic economy was of a low order, having only

roughly formed implements of stone, bone and horn. They had few ornaments, little or no pottery, and no domestic animals with the possible exception of the dog. But even at this low and early stage there were among the shell-eaters of Portugal both dolichocephali and brachicephali. The former were greatly in excess of the latter in point of numbers, and being the descendants of the Palæolithic people may be regarded as indigenous. The latter, on their first appearance in Europe, were not more civilized than the former, but there was a constant stream of new-comers who gradually introduced improved methods in the manufacture of tools, the cultivation of grain, and the rearing of domestic animals.

Meantime the Troglodyte hunters of wild animals continued to live, but in gradually diminishing numbers, on the uplands of France and the flanks of the Pyrenees—localities where the reindeer and other animals of sub-Arctic origin still lingered. Contemporary with them, but outside the areas of their hunting-grounds, their fellow-countrymen, along with the ever-increasing population from Eastern lands, were devising new sources of food from the natural products of a more ameliorated climate. If the advancing geniality of the environment gave the *coup-de-grâce* to the sub-Arctic fauna and flora, it also supplied meteorological conditions favourable to fruit-growing, the cultivation of cereals, and the rearing of domestic animals. In

short, the main elements of Neolithic civilization, including the disposal of the dead in caverns, or artificially constructed megalithic chambers, were established in various parts of Europe, even before the final close of Palæolithic civilization.

We have seen that the so-called *Hiatus* theory has been disproved on the Continent by the discovery of a number of inhabited sites (caves, rock-shelters, shell-mounds, hut-dwellings, etc.) showing by the character of the relics found in their débris that there had been no break in the continuity of human occupation from late Palæolithic to Neolithic times. The existence of such transition stations within the British Isles is, perhaps, not yet sufficiently pronounced to entitle archæologists to accept this opinion as applicable to Britain. The submergence of the land in the south of England, which has been advanced in these pages to partly account for the rarity of the evidential materials in support of the continuity of human life in Britain, requires more elucidation than the space at my disposal allowed. But if the theory be well founded, more convincing facts will, no doubt, be soon forthcoming. It is probable that the last phase of the Palæolithic civilization came to a close earlier in Britain than in France, in consequence of the warmer climate of the former which came into action as soon as the British area became an island, and was possibly accelerated by the

Gulf Stream. Under these circumstances the reindeer would instinctively move northwards until it reached the north of Scotland where, according to historical evidence, it lived up to the twelfth century A.D. What is more natural than to suppose that some of the Palæolithic people of the south of England followed the dwindling herds of this animal as far as Caithness, where they have left some of their skeletons and traces of their transformed culture habits in the pre-Neolithic shell-heaps described by Laing and Huxley. Others of these " river-bed " wanderers found their way into the inland sea in the upper reaches of the Forth valley, where they came in contact with the famous school of stranded whales. Others pushed on till they reached the west highland lochs and islands, where they obtained abundance of food supplies in the luxuriant marine and land faunas of that district. No polished stone implements, or any worked objects characteristic of the Neolithic civilization, have hitherto been found on any of the sites inhabited by these primitive people.

BIBLIOGRAPHY

J. C. Prichard, *Natural History of Man* (1843) ; Boucher de Perthes, *Antiquités celtiques et antédiluviennes* (1847–1864) ; Sir D. Wilson, *Prehistoric Annals of Scotland* (1857, 2nd ed. 1863) and *Prehistoric Man* (1862, 2nd ed. 1876) ; T. Bateman, *Ten Years' Diggings in Celtic and Saxon Grave Hills* (1848–1858) ; T. H. Huxley, *Man's Place in Nature* (1863) ; Sir Charles Lyell, *Antiquity of Man* (1863, several eds.) ; E. B. Tylor, *Early History of Man* (1865), *Primitive Culture* (1871) and *Anthropology* (1881) ; Lord Avebury, *Prehistoric Times* (1865, 6th ed. in 1900) and *Origin of Civilization* (1870, 6th ed. in 1902) ; Lartet and Christy, *Reliquiæ Aquitanicæ* (1865–1875) ; F. Keller, *The Lake-dwellings of Switzerland* (1866, 2nd ed. 1878) ; S. Laing and T. H. Huxley, *Prehistoric Remains of Caithness* (1866) ; W. Pengelly, *Literature of Kent's Cavern* (1868) ; Baron von Sacken, *Das Grabfeld von Hallstatt* (1868) ; L. Jewitt, *Grave Mounds and their Contents* (1870) ; Charles Darwin, *The Descent of Man* (1871, several eds.) ; E. Dupont, *L'Homme pendant les Âges de la Pierre* (2nd ed. 1872) ; Sir J. Evans, *Ancient Stone Implements* (1872) and *Ancient Bronze Implements of Britain* (1881) ; J. Fergusson, *Rude Stone Monuments in all Countries* (1872) ; A. de Quatrefages, *Human Species* (English ed. 1879) ; W. Boyd Dawkins, *Cave Hunting* (1874) and *Early Man in Britain* (1880) ; Greenwell and Rolleston, *British Barrows* (1877) ; J. Geikie, *Prehistoric Europe* (1880) ; G. and Ad. de Mortillet, *Le Préhistorique* (1883, 3rd ed. in 1900) ; J. Anderson, *Scotland in Pagan Times*, (1886) ; E. Vouga, *Les Helvètes à la Tène* (1885) ; V. Gross, *La Tène : un oppidum helvète* (1886) ; A. Bertrand, *Archéologie celtique et gauloise* (1889) ; E. Cartailhac, *La France préhistorique* (1889) ; R. Munro, *The Lake-dwellings of Europe* (1890) and *Prehistoric Scotland* (1899) ; A. Bertrand and S. Reinach, *Les Celtes dans les vallées du Pô et du Danube* (1894) ; A. H. Keane, *Ethnology* (2nd ed. 1896) and *Man Past and Present* (1899) , A. C. Haddon, *Study of Man* (1897) ; W. Ripley, *The Races of Europe* (1900) ; S. Reinach, *Époque des alluvions et des cavernes* (1899) and *Guide illustré du musée de Saint Germain* (1908) ; B. C. A. Windle, *Remains of the Prehistoric Age in England* (1904) ; E. Haeckel, *Evolution of Man* (1906, translated from the 5th ed.) ; R. Mortimer, *Forty Years' Researches*

in Burial Mounds in Yorkshire (*circa* 1907); J. Déchelette, *Manual d'archéologie préhistorique celtique et gallo-romaine* (1908); W. J. Sollas, *Ancient Hunters and their Modern Representatives* (1911); A. Keith, *Ancient Types of Man* (1911); W. L. H. Duckworth, *Prehistoric Man* (1912); R. Munro, *Palæolithic Man and Terramara Settlements in Europe* (1912); J. Abercromby, *A Study of the Bronze Age Pottery of Britain and Ireland* (1912); A. Bulleid and H. St. George Gray, *The Lake-village of Glastonbury* (1911–1913); The series of *British Museum Guides* to the Stone, Bronze and Iron Ages (1902–1905); Clement Reid, *Submerged Forests* (1913).

The above are merely a few of the more accessible and indispensable works on Anthropology and Prehistoric Archæology: but the student who wishes to keep in touch with modern discoveries will have to be conversant with the Proceedings and Publications of the principal Societies on these subjects.

The following volumes in the HOME UNIVERSITY LIBRARY should be read *along with* this one: A. Keith, *The Human Body;* R. R. Marett, *Anthropology;* J. L. Myres, *The Dawn of History.*

INDEX

ABERCROMBY, THE HON. JOHN, 247
Acheuléen epoch, 88
Ages of stone, bronze, iron and copper, 134
Alignments, 202
Altamira, cave of, 65
Anderson, Dr. Joseph, 120, 174
Animals, life histories of, 12
——, locomotion of, 18
Anthropology, methods of investigation of, 26
Aurignacien epoch, 90
Avebury, stone circle at, 188
Azilian harpoons, 106–123

Barrows, 187, 197
Bâton de commandement, 95
Baumes-Chaudes, cavern of, 245
Beehive huts, 208
Belgian caverns, 57
Boule, Professor, 77, 109
Brain, development of, 24
Breuil, Professor, 97, 98, 132
Britain (prehistoric) defined, 7
—— its land and animals, 9
—— joined to continent, 9, 101
Broca, Dr., 244
Bronze Age, art of, 153–155
——, implements of, 147–150
——, ornaments, 152
——, weapons, 150–152
Brythons, the, 248
Buckland, Dr., 47
Bulleid, Mr. Arthur, 227
Burial after cremation, 200
—— by inhumation, 185, 199
Burn Moor, stone circle at, 195
Burnard, Mr. Robert, 213
Busk, Mr., 239

Caisteal-nan-Gillean, 117
Callernish stone circle, 193
Camps and Forts, 222
Cartailhac, M. E., 98, 109
Caverns with wall pictures, 97
Chelléen epoch, 87
Chelles, fauna of, 67

Chin, development of, 25
Christy, Mr. Henry, 62, 63, 89, 93, 94
Clava, stone monuments at, 196
Clinch, Mr. George, 221
Closmadeuc, M., 133
Coffins, 185
Cogul, fresco on rock of, 182
Conwell, Mr. E. A., 173
Cresswell caves, 47
Cro-Magnon race, 81–83
Cromlechs, 188–197
Crowther-Beynon, Mr., 235
Culture of Palæolithic people, 86–100

Dartmoor, antiquities of, 217
Darwin's *Origin of Species*, 39
Dawson, Mr. C., 52
Déchelette, M. Joseph, 63
Denise, fossil man of, 35
Desor, Professor, 165
Dolmens, 197
Druimvargie rock-shelter, 117
Dupont, M. E., 58, 242, 243

Early discoveries, 28
Elevation of the land, 16
Epochs—*Chelléen*, 87; *Acheuléen*, 88; *Moustérien*, 89; *Aurignacien*, 90; *Solutréen*, 91; *Magdalénien*, 92; *Tourassien*, 109
Erect attitude, 19
Ethnology, 228–252
Evans, Sir Arthur, 170, 171
——, Sir John, 148, 151
Evolution of man, 22

Facial bones, retrocession of, 24
Falconer, Dr. Hugh, 31
Fergusson, Mr. James, 190
Fondouce, M. C., 104
Franks, Sir A. W., 29, 152, 168, 169

Galley Hill skull, 51
Galloway, Mr. W., 120
Garson, Dr. G., 51
Gatty, Rev. R. A., 130
Geikie, Professor James, 69
Giant graves, 187
Gladstone, Dr., 145
Glastonbury Lake-village, quoted, 175
Gowland, Dr., on Stonehenge, 191
Graves, stone-lined, 186
Gray, Mr. St. George, 227
Greenwell, Canon W., 130, 144, 162
Grime's Graves and Cissbury, 138
Grimspound, 218
Gundestrup bowl, 171

Hallstatt, Civilization of, 160–164
Hamard, L'Abbé, 133
Hand, development of, 29
Harpoons, 94, 106–123
Hervé, M. Georges, 74
Hinton, Mr., 234
Holywood circle, 196
Homo heidelbergensis, 35, 86
Homo mousteriensis, 77, 181
Hut-circles, etc., in Cornwall, 212–217
Huxley, Professor, 38, 233, 239, 240, 246

Ice age, its effects, 14
Inhabited sites, 205–228
Interglacial periods, 14
Iron age, 155–178

Keith, Dr. Arthur, 130, 231
——, on Tilbury man's age, 231
——. *Types of Man*, quotation from, 233
Keller, Dr. Ferdinand, 165
Kent's Cavern, 30, 44
Kirkdale Hyæna Den, 47
Kjökkenmöddings, 43, 111, 237
Klaatsch, Professor, 76, 181

Lake-dwellings, 225
Lake-villages of Glastonbury and Meare, 226
Lartet, Mr. Ed., 61, 62, 63, 89, 93, 103, 243
Late Celtic Period, 168–178
La Tène Civilization, 164–168
Leach, Mr. A. L., 126
Levallois, Le grand éclat, 78, 89
L'Homme-Mort, cavern of, 244
Life, origin of, 11
Little Salkeld circle, 195
Lockyer, Sir Norman, 192
Lyell's *Antiquity of Man*, 40, 57, 90

MacArthur Cave, 114
MacEnery, Rev. J., 30
Magdalénien race, 79–83; epoch, 92
Man, a toolmaker, 22
Man of the River Drift Period, 68–72

Martin, Dr. H., 77, 78
Mas-d'Azil, 105 *et seq.*
Mayborough, ring-mound of, 195
Megalithic chambers, 186, 198
Menhirs, 201
Mer de glâce, 15
Mortillet, G. de, 73, 86, 103
Mortimer, Mr. J. R., 239
Moulin-Quignon Jaw, 32
Moustérien epoch, 89
Munro Lectures, quoted, 40, 236

Naulette jaw, 60
Neanderthal skeleton, 36, 76
Neanderthal-Spy race, 74–79
Neolithic Age, 101
Neolithic and Bronze Age people, 241–248
Newton, Mr. E. T., 51
Nüesch, Dr., 111

Odin, stone of, 194
Oppidum, La Tène, 166, 177
Origin of Species, 39
Owen, Professor, 50

Palæolithic Man in Britain, 17
—— characters of, 18
Pengelly, Mr., 64, 124
Perthes, Boucher de, 29, 31
Petrie, Dr., 225
Piette, M. Ed., 98, 105, 103
Piltdown skeleton, 25, 52, 70, 88
Pit-dwellings, 130, 221
Pitt-Rivers, General, 172, 224
Plants, evolution of, 12
Pleistocene fauna (in Ireland), 49
Polybius, quoted, 157
Pottery, sepulchral, 200, 201
"Prehistoric Britain" defined, 7
Prehistoric Times, quoted, 188
Prestwich, Lady, 32
Propulseur, 93
Pruner-Bey, Dr., 248

Race de Grimaldi, 83, 84
Reid, Mr. Clement, 74, 231, 233
Reilhac, *Grotte de*, 109
Relation of man to apes, 21
Religiosity, 178–188
Ring of Brogar, 194
River-bed race, 238–241
Rocking stones, 208
Rolleston, Profe.sor, quoted, 239
Rollrich, circle of, 195
Rutot, M. A., 59, 78

Sacken, Baron von, 160
St. David's Head, rampart at, 220
Salmon, M. Philippe, 112, 243
Schmerling, Dr., 30
Schoetensack, Professor, 85
Schwab, Col., 165
Schweizersbild rock-shelter, 111
Shetland stone knives, 139
Sinel, Mr. J., 124, 126
Smith, Mr. Reginald, 139
——, Mr. Worthington G., 56
Solutréen epoch, 91
Spirals, distribution of, 155
Spurrell, Mr. F. C. J., 50, 56
Spy skeletons, 75
Stanton Drew, circles at, 193
Stennis standing stones, 194
Stone Age, Implements, 136
——, Weapons, 140
——, Dress and Ornaments, 142
Stonehenge, 190
Strabo, quoted, 180
Stranded whales, 121
Stukely, Dr., 190
Submergence of land, 122–128, 132

Tacitus, quoted, 211
Tertre-Guerin, cavern of, 245
Thurnam and Davies, 239, 241, 249
Tilbury man, 42, 231, 232
Tourassien epoch, 109
Towers of Silence, 186
Tranchet, the, 112
Treceiri, Fort of, 219
Tumuli, 197, 198
Turner, Sir W., 121
Tylor, Dr. E. B., 179

Underground dwellings, 209

Verneau, Dr. R., 83, 84
Vestigial organs, 22
Vitrified Forts, 224
Vouga, M. E., 165, 166

Walton-on-Naze, submerged habitable sites at, 128; submerged burial at, 230, 232
Warren, Mr. S. Hazzledine, 128
Wilde, Sir W., 150, 239
Wilson, Sir Daniel, 238
Woodward, Dr. A. Smith, 52, 70
Wookey Hole, 48
Worlebury, pit-dwellings at, 219

Unwin Brothers, Ltd., London and Woking.

This book is DUE on the last
date stamped below

LD
URL NOV 24 1971
REC'D LD-LRL

NOV 17 19
REC'D LD-URL
LD
URL MAR 18 1977

MAR 9 1977

DISCHARGE-URL

JUN 9 1981

4 WK MAR 26 1998

4 WK APR 14 1999

REC'D C.L APR 20 99

10m-11,'50(2555)470

3 1158 00066 1842

UC SOUTHERN REGIONAL LIBRARY FACILITY

AA 001 169 517 8